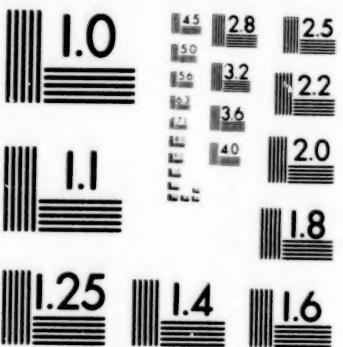
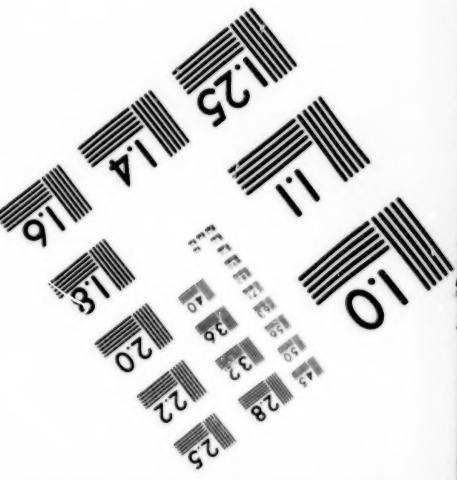


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4 May 1984

# USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 2, February 1984

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4 May 1984

**USSR REPORT  
MILITARY AFFAIRS**

**AVIATION AND COSMONAUTICS**

No. 2, February 1984

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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## KUTAKHOV ARTICLE ON 66TH ANNIVERSARY OF SOVIET ARMED FORCES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 1-3

[Article by USSR Deputy Minister of Defense Hero of the Soviet Union Chief Mar Avn P. Kutakhov, commander in chief of the Air Forces: "Mighty Bulwark of Peace and Socialism"]

[Text] On 23 February the Soviet people and their fighting men, the working people of the nations of the socialist community, the members of their armed forces, and millions of our friends abroad will be celebrating with great fanfare and ceremony the 66th anniversary of the Soviet Army and Navy.

On this important date our country is honoring all those who established the Soviet Armed Forces, who honorably carried their fighting banners through all the trials and ordeals, who by their labor forged out victory, strengthened the defense capability of the homeland of the Great October Revolution, and who today are ensuring the might and combat readiness of our forces. We are honoring the bright memory of those who have fallen in the struggle for the freedom and independence of the homeland.

The birth and development of the Soviet Armed Forces as well as their heroic combat journey are integrally linked with the activities of the Communist Party and with the name of V. I. Lenin. Vladimir Il'ich Lenin formulated and scientifically substantiated the military program of the proletarian revolution, teaching on defense of the socialist homeland, as well as the fundamental principles of creation of the military organization of the victorious proletariat -- party guidance of the Armed Forces, a class approach to their organizational development, unity of army and people, and faithfulness to proletarian internationalism. V. I. Lenin was not only a great military theorist but also an organizer of defense of the socialist homeland, creator and leader of the military organization of the world's first socialist state. "The Red Army," noted M. V. Frunze, "is the finest offspring and legacy left by Comrade Lenin, that principal force which guarantees our peaceful building of communism...."

This year Soviet Army and Navy Day is being celebrated in an atmosphere of enormous political and labor enthusiasm. In the third year of the five-year plan new, higher levels of achievement have been attained in development of our nation's economy, in strengthening discipline and organization, and in a

further upsurge in the totality of our country's sociopolitical affairs. Our economy has taken great strides forward. Today a single percentage point of national income incremental growth totals approximately 5 billion rubles, and its actual "weight," in comparison with 1950, for example, has increased almost 10-fold. Industrial output is growing, especially in those branches which determine scientific and technological advance. The homeland has been gladdened by the shock-work labor of the builders of the Baykal-Amur Mainline and the unique Urengoy-Pomary-Uzhgorod natural gas pipeline, by the conquerors of the vast expanses of Earth and space. Our country's Food Program is being implemented. The level of prosperity of our people is rising year by year. All this is vivid evidence of the selfless accomplishments of Soviet citizens, who are carrying out the historic decisions of the 26th CPSU Congress, the November (1982), June, and December (1983) CPSU Central Committee plenums.

Today one of the most important tasks in the history of the Soviet Union is being carried out in the daily work efforts of millions of urban and rural toilers -- planned and orderly improvement of the society of developed socialism. The CPSU has adopted a course of policy directed toward shifting the nation's economy to a path of intensive development, which signifies first and foremost combining the advantages of the socialist system with scientific and technological advances. And this course of policy adopted by our party is enjoying enthusiastic support by the entire people.

The Soviet Armed Forces, being genuinely popular, are making a worthy contribution toward the grandiose accomplishments of our homeland. They faithfully serve the interests of the socialist society, vigilantly stand guard over the peaceful, productive labor of the Soviet people, and constitute a powerful bulwark of peace and socialism.

The glorious history of our Armed Forces began in February 1918 when, responding to the appeal of the Communist Party and Soviet Government, thousands of workers and peasants joined the ranks of the Red Army to defend the people's rule and the achievements of the Great October Revolution. Recalling today those grim revolutionary years, we are filled with admiration when we think of those people who, locked in savage combat, penned by their combat deeds the first lines of the heroic biography of our Armed Forces. These were fearless soldiers of the revolution, fighting men of extraordinary courage and daring. A grateful people sang the praises of the exploits of the Red warriors in song, story and legend. The heroes of Narva and Pskov, Petrograd and Tsaritsyn, Kakhovka and Perekop, Volochayevka and Spassk.... Even today they serve as a vivid example of unbending revolutionary spirit, courage and faithfulness to military duty.

While stressing the enormous historic significance of the results of the Civil War, V. I. Lenin at the same time pointed to the necessity of continuing in the future to be alert and fiercely to guard our country's defense capability. He pointed out that as long as imperialism continues to exist, there will also continue to exist an external threat to socialism and the danger of military attack and acts of provocation.

Our party and people, engaged in the peaceful building of socialism, have not forgotten this Lenin precept for a single moment. Industrialization of our

country, collectivization of agriculture, a cultural revolution, and consolidation of the friendship among the Soviet peoples has enabled us to create the essential and determining preconditions for repulsing new acts of aggression by imperialism.

A special place in the history of the USSR and its Armed Forces is occupied by the Great Patriotic War -- the most severe of all the wars ever experienced by our homeland. The Soviet Armed Forces were only 23 years old when they were hit by the most powerful military machine of the time, the army of Hitlerite Germany, which had gathered into a powerful striking fist the economic and military resources of almost all of capitalist Europe. And no matter how bitter were our first setbacks in the war, they did not shake the staunchness of our people and failed to shatter the fighting spirit of the Soviet Armed Forces. During this difficult time for the homeland, the Communist Party mobilized all our country's resources to repulse the foe.

Victory was forged out in difficult days of battle and labor. The groundwork was being laid at the walls of the Brest Fortress, in the blizzard-wracked fields of Moscow Oblast, in the foothills of the Caucasus, on the banks of the Volga, at Leningrad, Sevastopol, Odessa, Novorossiysk, in the Battle on the Kursk Salient.... An indomitable striving toward final victory guided our fighting men during liberation of the Ukraine, Belorussia, the republics of the Soviet Baltic, the Arctic, and subsequently during the liberation of Warsaw and Prague, during the capture of Budapest and the assault on Berlin.

Acting precisely in conformity with its pledge as an ally, on 8 August 1945 the Soviet Union entered the war against militarist Japan. In the difficult conditions of the Far Eastern Theater of Operations, our army, in the course of 26 days, defeated in detail the more than one-million-man-strong Kwantung Army and liberated Northeastern China. On 2 September 1945 Japan signed an instrument of unconditional surrender.

The Communist Party was the inspirational force behind and organizer of the victory of the Soviet people and their Armed Forces, ensuring a unity of political, economic, and military-strategic leadership. With thoughts of the homeland and the Leninist Party to buoy their spirits, Soviet fighting men withstood the furious onslaught of the Hitlerite war machine, totally shattered it, and gained in the Great Patriotic War a victory of world-historic significance.

The homeland worthily honored the courage and valor of its sons. More than 7 million persons were awarded medals and decorations for their exploits on the battlefronts of the Great Patriotic War, and more than 11,000 fighting men were awarded the title Hero of the Soviet Union. Almost three fourths of these were Communists.

The world-historic victory of the USSR in the Great Patriotic War over the shock forces of imperialism, the 40th anniversary of which the Soviet people and all progressive mankind are preparing to celebrate with great fanfare and ceremony, clearly confirmed the advantages of socialism and demonstrated the inspirational force of Marxist-Leninist ideology. This victory exerted enormous influence on the development of world events and on the lives of millions of people on all

continents. As a result socialism advanced beyond the boundaries of a single country, and today the fighting men of the armies of the brother socialist nations, united by the Warsaw Pact, are guarding the achievements of socialism shoulder to shoulder with the Soviet Army.

The results of the war serve as a stern warning to any and all latter-day warmongers and claimants to world domination. Fanciers of military adventures would do well to remember the following wise words, which are filled with profound meaning and which have been confirmed by history time and again: "He who comes at us with the sword will die from the sword." This warning rings particularly forcefully today, in conditions where the present U.S. administration is increasingly more openly pursuing a militarist course of policy in the international arena, a policy which presents a serious threat to peace. "Its essential substance," states CPSU Central Committee General Secretary Comrade Yu. V. Andropov, chairman of the Presidium of the USSR Supreme Soviet, "is an attempt, ignoring the interests of other nations and peoples, to secure for the United States a dominant position in the world."

The Reagan Administration is proceeding hell-bent for election, seeking at all costs to bring to an end the existing strategic parity with the USSR, since this parity impedes implementation of Washington's hegemonist imperial aims. We are essentially dealing with logistic support for a "crusade" against the USSR, with the aim of destroying socialism as a sociopolitical system. New nuclear weapon systems are being developed, both strategic and intermediate-range, systems which are viewed as "disarming" first-strike weapons. Modernization of conventional arms and general-purpose forces is advancing at an unprecedented scale and pace in the United States and NATO. Plans are being formulated for militarization of space.

A monstrous arms race is being forced upon mankind. U.S. military appropriations for Fiscal Year 1984 totaled 280 billion dollars, while the Pentagon is requesting more than 320 billion dollars for 1985. This is two to two and a half times more than total U.S. military expenditures only 3 or 4 years ago.

The present U.S. administration and military-industrial complex, to use the words of V. I. Lenin, comprise a "close-knit international gang, which is inciting peoples to arms competition...." The White House has frankly and openly elevated covert subversive operations as well as "psychological warfare" to the level of standard government policy. "Doctrines" which open wide the doors for any and all acts of international banditry are proclaimed for all to hear. The U.S. aggression on Grenada, the blockade of revolutionary Nicaragua, armed intervention in Lebanon, and genocide in El Salvador -- these are their bandit "doctrines" in practice.

The NATO countries are becoming increasingly drawn into implementation of Washington's insidious plans, and Japanese militarism is experiencing a revival, and is being hitched up to the military-political machine of the NATO bloc. The United States is openly supporting counterrevolutionary bands in Afghanistan, is continuing its crude attempts to meddle in the internal affairs of the Polish People's Republic, and is stepping up its threats directed toward socialist Cuba. Particularly dangerous to the cause of peace is the plan calling for nuclear missile "up-arming" of NATO, a plan which calls for the additional

deployment of approximately 600 new U.S. intermediate-range missiles in Western Europe, missiles which can be used as a first-strike weapon.

"Can the Soviet Union and the other socialist countries ignore this danger?" stated CPSU Central Committee General Secretary Yu. V. Andropov, chairman of the Presidium of the USSR Supreme Soviet, on 24 November 1983. "No, they cannot. This is why top party and government leaders of seven socialist countries declared at a meeting in Moscow on 28 June 1983 that under no circumstances will they permit establishment of military superiority of the NATO bloc over the countries of the Warsaw Pact." USSR Armed Forces personnel, just as the entire Soviet people, enthusiastically and unanimously support this Declaration by Comrade Yu. V. Andropov and are demonstrating their readiness and willingness to continue vigilantly performing military service and to achieve additional successes in military labor.

In response to deployment of U.S. missiles in Europe, the Soviet Union, the German Democratic Republic, and the Czechoslovak Socialist Republic have been forced to take requisite measures. Preparatory work, which began some time ago, on deployment of extended-range operational-tactical missiles on the territory of the GDR and Czechoslovakia has been stepped up, and the moratorium on deployment of Soviet intermediate-range nuclear weapons in the European part of the USSR has been lifted. Soviet weapons corresponding to U.S. missiles will be deployed in the oceans and seas. Other measures will also be taken, directed toward ensuring the security of the USSR and the other nations of the socialist community.

In conditions of a growing military threat, and proceeding from the interests of peace and security, the Communist Party and Soviet State constantly concern themselves with strengthening the combat might of the Armed Forces. The Soviet people totally support the defense measures of the party and state. Our army and navy constitute a powerful factor in restraining the aggressive aspirations of imperialism. Thanks to the concern of the CPSU and Soviet Government, the combat potential of the Soviet Armed Forces today comprises a solid fusion of a high degree of technical equipment, military expertise, and indomitable morale. The Soviet Armed Forces are alert and on guard at all times.

In his address at a unified political education day at the central edifice of the USSR Ministry of Defense, USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, proceeding from the present situation, assigned the Armed Forces the tasks of maintaining a high level of vigilance, improving their training and combat readiness, achieving further improvement in the technical equipment of troops and naval forces, mastering new weapons and equipment, further development of the art of warfare, and adoption of all new and advanced elements in the training process.

He stressed that in the new training year principal efforts should be directed toward strict and absolute implementation of the demands of the CPSU Central Committee, Soviet Government, and the instructions of Comrade Yu. V. Andropov pertaining to further increasing the readiness of the Armed Forces to repulse aggression and to crush the adversary in any and all conditions of potential initiation and conduct of war.

For military aviation personnel these instructions signify first and foremost improvement in quality indices in all areas of Air Forces training and development, excellent knowledge, knowledgeable operation and maintenance of weapons and combat equipment, and strict, unwavering performance by each and every aviator of his job duties at his assigned post, and achievement of maximum results at minimum cost. Each and every hour of precious training time must be utilized intelligently and with maximum benefit for combat and political training. It is essential to ensure that each and every aircrew, each and every subunit is well trained and prepared for successful performance of combat missions, and that the level of personnel proficiency not lag behind the level of development of science and technology. It is necessary more boldly to adopt the latest advances in science and technology in order to improve aircraft and aircraft weapons, airfield servicing and maintenance facilities, support facilities, and means of troop command and control.

Advancing to the forefront in present conditions is concern about increasing the effectiveness of measures carried out within the combat and political training system, which signifies first and foremost careful and thorough organization of combat training, constant and continuous improvement of training methodology, incorporation of positive experience and know-how into the training process, and eradication of unnecessary relaxation of demands and unnecessary situation simplification. We must constantly seek out and assimilate methods of maximum effective employment of combat equipment and weapons, seeking implementation of the demands: "Every rocket, missile, bomb, and shell into the target" and "If I see the target, it will be destroyed." Speed, altitude, maneuver, protective and other performance characteristics of weapons and combat equipment should be utilized in full measure thereby.

Today's weapons demand of commanders persistent and systematic broadening and deepening of their political and military-technical knowledge, their knowledge of education science and psychology in order successfully to teach and indoctrinate their subordinates. A combination of ideological conviction, well-developed operational-tactical intellectual breadth, commander volition, and general level of sophistication with the highest degree of professional competence and expert mastery of combat equipment comprises the foundation of successful performance by commanders at all levels.

Political and moral-psychological conditioning, personnel technical, tactical, and operational proficiency are important components of a high degree of Air Forces combat readiness. We know that combat systems, even the most sophisticated, do not ensure victory of and by themselves. Victory is gained by personnel, who possess an excellent mastery of weapons systems and skillfully utilize their combat capabilities. This is why it is essential that all military aviators possess excellent mastery of their weapons and equipment, thorough knowledge of their performance characteristics, and have the ability to utilize them with maximum effectiveness in any and all conditions of modern combat. Particular attention in daily training should be focused on excellent knowledge and mastery of the command and control system and thorough training of combat crews, with the aim of ensuring maximum combat effectiveness of modern aircraft systems in any and all situations and in close teamwork and cooperation with other arms of service.

The more complicated the combat equipment which enters service, the better should be the quality of technical and specialized training of crews, subunits, and groups. It is necessary to display unrelenting concern with developing proficiency-rated specialists, with ensuring that personnel learn related occupational specialties and more rapidly master the assigned combat equipment. Purposefulness and systematic independent study should play a particularly important role in the professional development of the pilot, engineer, technician, and aviation specialist -- masters of their profession.

Excellent quality of accomplishment of flight training schedules is closely linked with ensuring flight operations safety. It is essential to ensure strict and unwavering observance of the rules and regulations of flying service by all who are directly connected with preparation for and conduct of flight operations. A scientifically substantiated system of practical training drills on simulators and incorporation of a method of psychophysiological testing of the flight-readiness of flight personnel should occupy an important place in efforts to ensure flight safety.

Firm military discipline and organization, as well as strict observance of the demands of military regulations and the orders of superiors is a mandatory condition for excellent quality of the entire training process. Wherever proper military order and discipline are maintained, service proceeds in strict conformity with military regulations, concern is shown for providing personnel with decent living conditions, and personnel selflessly carry out their military duty.

Active military-scientific work by officer cadres makes a substantial contribution toward improving the quality of training and indoctrinating personnel, and consequently the combat readiness of subunits and units. It should encompass all areas of our activities. It is necessary intelligently to analyze combat training experience and on this foundation to formulate recommendations on the most effective forms of training and combat employment of modern aircraft systems, ensuring optimal utilization of weapons and combat equipment, as well as on shortening the time required to master new aircraft and improved troop command and control. In improving the effectiveness of military scientific effort, one should at the same time seek to achieve more rapid practical adoption into personnel training and indoctrination of advances in science and technology, military education science and psychology.

Party-political work in the Armed Forces promotes improved execution of combat training tasks. Its main task is to achieve further increase in efforts to implement the decisions of the 26th CPSU Congress, the guidelines of the June and December (1983) CPSU Central Committee plenums, and the instructions of Comrade Yu. V. Andropov on further increasing Armed Forces combat readiness. It is important to ensure a high degree of ideological conditioning, preparedness of all personnel to defend the homeland, and a profound understanding of the exceptional complexity of the present international situation and the increased danger of unleashing of another world war by imperialism. It is necessary aggressively and persistently to instill a high degree of vigilance and to mobilize all military personnel to boost the combat readiness and proficiency of each and every subunit, unit, and naval ship, as well as strengthening of military discipline.

Ideological and mass political work requires continuous improvement. It must be conducted in conformity with the guidelines of the June (1983) CPSU Central Committee Plenum and other party decisions. The entire indoctrination process must be subordinated to the goal of ensuring that each and every commander, political worker, pilot, engineer, technician, and aviation specialist carry out his duties with enthusiasm, innovatively and at full effort, display conscientiousness in performance of duty, persistence in training, and a high degree of integrity in relations with subordinates and comrades. As is demanded by the USSR minister of defense, a more vigorous effort should be made to enlist war veterans in this work -- persons who have experienced the entire weight and gravity of war.

The total dedication of Soviet military personnel to the great cause of the Leninist party, the cause of communism, is embodied in concrete actions and in daily selfless military labor.

The armed forces competition which took place in the military under the slogan "Be alert, constantly ready to defend the achievements of socialism!" became a vivid example of patriotic concern for the quality of combat training of aviation units and subunits. The appeal issued by the men of a guards fighter regiment evoked broad support in all Air Forces units and subunits. In the course of socialist competition aviation personnel are seeking to achieve further improvement in air proficiency, expert mastery of new aircraft and weapons, proper care of this equipment, high-quality execution of combat and political training tasks, and exemplary military order.

The excellent results in combat and political training achieved by vanguard aviation units and subunits attest to the effectiveness of competition. The men of the aviation units and subunits under the command of officers N. Kopylov, A. Derbenev, V. Bayev, and others are successfully meeting socialist pledges in the first months of the training year. Communists comprise the heart and soul of competition. By personal example they are mobilizing the men to achieve excellent training results.

The Soviet Armed Forces have trod a great and glorious road. For 60 years they have vigilantly stood combat watch, reliably guarding the achievements of the Great October Revolution. Their high degree of combat power and continuous combat readiness have been and continue to be a firm guarantee of ensuring the security of the sacred borders of our socialist homeland and the peaceful labor of the Soviet people.

Air Forces personnel, solidly ranked behind the Communist Party and its Leninist Central Committee, marching shoulder to shoulder with the fighting men of the other branches of the Armed Forces, are prepared to defend with honor and dignity the interests of our great homeland and the other nations of the socialist community.

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## HISTORICAL DOCUMENTS REVEAL LENIN'S ROLE IN EARLY DEVELOPMENT OF SOVIET MILITARY AVIATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 4-5

[Article, published under the heading "On the Track of Lenin Documents," by Candidate of Historical Sciences Col Ye. Sergeyev: "Carrying out the Leader's Instructions"]

[Text] Celebrating the 66th anniversary of the USSR Armed Forces, Soviet citizens note with a profound sense of gratitude the invaluable role of Vladimir Il'ich Lenin in establishing and strengthening the Red Army, which became a reliable shield of the Soviet Republic.

Teaching on defense of the socialist homeland is the product of V. I. Lenin. It organically proceeds from the Leninist theory of socialist revolution and reflects the objective mechanism of armed defense of socialism in conditions of a struggle between two opposing world societal systems.

Even before the Great October Revolution Vladimir Il'ich demonstrated in his "Military Program of Proletarian Revolution" that armed defense of the socialist homeland is a historical necessity. He proceeded from the position that victory by a socialist revolution would without fail evoke not only friction but also an outright endeavor by the bourgeoisie of other countries to crush the victorious proletariat of the socialist state.

The correctness of this prediction has been confirmed by the subsequent course of our country's history. Our people were compelled to build a new society on the rubble of the old society, and at the same time to defend the young Soviet Republic in deadly clashes with imperialism, which was attempting to strangle by force the world's first worker-peasant state.

V. I. Lenin directed the activities of the Communist Party pertaining to defense of the homeland from the very first days of existence of the Soviet Republic, and he organized the combat operations of the Red Air Force. More than 30 documents speak of the enormous attention which the leader of the proletariat devoted to continuous readiness and combat operations of military aviation during the years of civil war and foreign military intervention. Here are some of them.

It was the beginning of March in the year 1918. The young Soviet Republic was encircled by the enemy. In Petrograd rumors were rife about the possibility of a German air attack on the city. It was necessary to sift through the incoming information, reassure the civilian population, and take measures for the defense of Petrograd by the Red Air Force.

Vladimir Il'ich discussed with P. I. Lebedev-Polyanskiy the state of affairs in the city's various rayons in connection with the anticipated air attack, and then asked F. I. Goloshchekin, who had arrived from the Urals for the Seventh RSDWP Congress, "to verify whether a German aeroplane in fact had flown over Petrograd."

The leader's instructions were executed. The investigation revealed that the information was based on false, provocative rumors. The fact of a flight by a German aircraft over Petrograd was not confirmed. Nevertheless, in view of the possibility of appearance of hostile aircraft, the first socialist air detachments, deployed around the city, were placed in a high state of alert.

Considerable attention is drawn by documents which supplement our information on execution by Vladimir Il'ich of S. G. Shaumyan's request to deliver aircraft to the Caucasus. This request was motivated by the fact that in April 1918 combat actions were fought in the Baku area against advancing interventionist forces and Mussavat bands. The pilots from the Baku Naval Aviation School who had been dispatched to engage them had difficulty in handling the superior enemy forces. Immediate help was needed.

On 24 May 1918 Vladimir Il'ich, as the Biographical Chronicle of V. I. Lenin reports, "received Baku Commune representative S. M. Ter-Gabrielyan, who was already in Moscow, and T. A. Manucharov, who had come from S. G. Shaumyan in Baku to obtain aircraft for the Caucasian Red Army, discussed the state of affairs with them..., gave instructions over the telephone to Air Force headquarters to detail a full-strength air detachment, plus aircraft (minus pilots) for a second detachment, to be dispatched to Baku; he sent Manucharov to military aviation headquarters with a note (the whereabouts and status of the note are unknown); he instructed Ter-Gabrielyan to inform him on execution of the instructions."

Wishing to complete this important piece of business as quickly as possible, that same day Lenin wrote a note to the People's Commissariat of Military Affairs, requesting that Ter-Gabrielyan be received on a priority basis, in connection with his departure for Baku at the head of a military detachment, and suggested that he utilize this trip to take emergency measures to give military assistance to the people of Baku.

A month later V. I. Lenin received a letter from S. G. Shaumyan: "Dear Vladimir Il'ich! Ter-Gabrielyan finally arrived today, bringing us 4 armored cars, 13 airplanes, and a large quantity of other goods. Thank you very much for all this. We have received that which we were lacking and which will now render us incalculable service...."

The combat equipment and other military supplies were immediately utilized in military operations. On 9 July Shaumyan wired Vladimir Il'ich: "The armored cars and airplanes which arrived from Moscow have been sent to the army, where they are already being utilized with considerable success...."

A vivid confirmation of V. I. Lenin's considerable foresight is his instructions on directing air combat operations in the northern part of the Soviet Republic.

Vladimir Il'ich maintained continuous, close communication with the officials directing the Northern Front, and in particular with M. S. Kedrov. We know that Lenin strongly reprimanded Kedrov for an unauthorized trip to Moscow with a report on the situation in the North and demanded that he immediately "organize the defense of Kotlas at all costs." But what was the reason for Vladimir Il'ich's concern?

In the first place, Kedrov's departure coincided with an incursion into our territorial waters by a British squadron, which marked the beginning of interventionist operations in Arkhangelsk Gubernia. Upon occupying Murmansk, Anglo-French and American troops seized Arkhangelsk and proceeded to threaten Vologda and Kotlas. In the second place, large stores of explosives and munitions were stockpiled in Kotlas. Ordering organization of defense of that city and issuing instructions "to send pilots there immediately," V. I. Lenin at the same time made provisions for the possible destruction of these supplies. He wrote a letter to M. S. Kedrov, in which, as the Biographical Chronicle of our leader informs us, "he recommended A. P. Nogtev and S. G. Uralov as staunch and dedicated individuals and indicated the purpose of their journey: to take preparatory measures for destroying the vast stockpiles of explosives in Kotlas in case of threatened capture of that town" (the letter has not been preserved). These facts fairly completely reflect the necessity of fighting to hold Kotlas.

It was not necessary to take extreme measures. Vladimir Il'ich's orders to defend Kotlas with aircraft were carried out. Twelve airplanes and crews were redeployed to that area. The Red pilots successfully conducted aerial reconnaissance and methodically delivered airstrikes on the interventionist ground forces. They boldly attacked the enemy and achieved victory in aerial combat.

The Red Army, together with military aviation, defended Kotlas and its military supplies, which was of enormous importance in the battle for the Soviet North.

Also of interest is another document, which provides additional information on Vladimir Il'ich's relationship with A. M. Ignat'yev, who invented an optical instrument for adjusting fire against aircraft. It had previously been known that Lenin had instructed the Council of People's Commissars Administration to issue Ignat'yev a pass to the government building, spoke with him, and then sent him to S. I. Aralov with a note containing a request to ensure that the inventor was provided with adequate conditions for his work. In June 1920 V. I. Lenin, accompanied by A. M. Gor'kiy, visited the Artillery Committee of the Main Artillery Directorate, where Ignat'yev briefed them on the instrument he had invented.

We have now learned that Lenin spoke with Aralov before sending Ignat'yev to see him. This fact once again stresses the solicitude which Vladimir Il'ich showed

toward specialists and how meticulously he worked on accomplishing the task of organizing combat against hostile aircraft.

The strenuous, bloody war effort against the interventionists and White Guard came to an end. Young Soviet military aviation also made a significant contribution to victory. "The heroic Red Army," stated a commendation issued by the Republic Revolutionary Military Council, "destroyed all White Guard entrenchments established by the Entente against the toiler republic. A distinguished role in this struggle has been played by the Republic Red Air Force, created by the hands of aviation workers. The Republic knows what great sacrifices were sustained by the Air Force for the happiness of the toilers, for consolidating their revolutionary achievements."

The skies over the Civil War battlefronts, aerial battles on the Chinese Eastern Railway and on the Khalkhin-Gol River, combat with fascist pilots in the skies over Spain, with the White Finns, and the crushing defeat of the Hitlerite Luftwaffe in the Great Patriotic War -- these are all glorious pages in the heroic chronicle of our Air Forces. All each and every victory, each and every new achievement by Soviet aviation is inseparably linked with the name of V. I. Lenin.

Implementing the historic decisions of the 26th CPSU Congress, the November (1982) and June (1983) CPSU Central Committee plenums on the necessity of further increasing army and navy combat readiness, personnel of the Air Forces, remembering Lenin's instructions, are vigilantly standing guard over the peaceful skies of our homeland and the other nations of the socialist community.

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## IMPORTANCE OF EFFECTIVE STAFF TACTICAL TRAINING STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 6-7

[Article, published under the heading "Be Alert, in a Continuous State of Combat Readiness," by Honored Military Pilot USSR Col Gen Avn P. Belonozhko, first deputy chief of the Air Forces Main Staff: "Headquarters Staff and Tactical Training"]

[Text] The Soviet Air Forces are equipped with modern aviation hardware and contain ideologically mature, highly-skilled military cadres who are totally dedicated to the homeland, who perform difficult and important combat training missions, day by day increasing the level of combat readiness of aviation sub-units and units. As USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, noted in his article in the 19 November 1983 issue of the newspaper PRAVDA, the CPSU Central Committee and USSR Government consider it their sacred obligation to the Soviet people continuously to maintain our country's defense capability and the combat readiness of the Armed Forces at a level adequate in order reliably to secure the peaceful labor of the Soviet people and to ensure the security of the peoples and nations of the socialist community. And the more serious the threat to the security of the socialist homeland, the higher our level of defense capability should be. This is a demand of the CPSU in the area of defense.

In this connection high demands are imposed on the headquarters staffs of aviation units, particularly pertaining to matters of organization of officer tactical training. Wherever the headquarters staff, under the guidance of the commanding officer, delves deep into the training and indoctrination process, thoroughly elaborates and substantiates designated measures, one finds a high level of air proficiency, firm military discipline, and strict and unswerving observance of military regulations.

The headquarters staff is a planning and administrative agency. Consequently the activities of staff officers presuppose first and foremost precise organization of labor, well thought-out planning, and flawless discipline of execution. Success in the work activities of aviation headquarters staffs is impossible without a high degree of officer professional training. Therefore correct selection and placement of staff personnel is one of the most important concerns of command authorities and party organizations.

The nature and content of work performed by headquarters staffs have expanded in present-day conditions, the volume of command, control and support tasks has grown, while time available for their accomplishment has decreased. This is dictated by the increased intensity of air operations, by the complexity of military aviation systems, combat hardware, command and control means, and by continuous improvement in the forms and modes of their employment in the engagement and operation. In these conditions success cannot be achieved without a well-conceived combat training plan and schedule for the year, training period, month, week, and day, and without precise organization of its execution (from the standpoint of staff officer specific activities), without constant and rigorous monitoring and verification.

The plan has the force of law, and execution of the plan is a party and governmental duty. It was emphasized at the November (1982) CPSU Central Committee Plenum: "...Great importance should be attached to strengthening state, labor, and execution discipline in every production sector, in all domains of management, and to improving work organization and efficiency." This applies in full measure to the work activities of headquarters staffs, which have the task of providing planning and verification to all categories of training.

The procedure and method of planning are specified by the appropriate documents. The achieved level of preparation of the unit, subunit, and each pilot (crew), the tasks assigned to the unit and subunits, the end goals, availability and condition of aircraft assets, level of preparedness of logistic support, state and condition of ranges and airfields, climatic-geographic, and other conditions constitute the foundation for planning combat (flight) training. The attained level of tactical training, new tasks and specific timetables serve as a point of departure for planning tactical training. Planning of tactical training should certainly be coordinated in detail with the level of combat training proficiency.

As we know, field exercises are the highest form of tactical training of troops and testing of their combat proficiency. It is very important in the course of planning to specify the topics to be covered in tactical air exercises, on the basis of those tasks which have been designated for the unit and subunits for the year or period of training. Training or research aims must be formulated and an exercise timetable specified proceeding from the exercise topic. The advisability of this is dictated by the fact that an air outfit should endeavor to seek new, most effective tactical devices and modes of action. Development of Air Forces tactics is inconceivable without this. This also makes it possible substantively to determine the subject matter and forms of tactical drills, the sequence of commander training, and to formulate a specific plan of preparation for an exercise and verification of readiness for the exercise. The headquarters staff does all this as well.

Practical experience indicates that tactical training is planned in the most skilled and high-quality manner at those aviation headquarters the staff officers of which regularly and systematically improve their level of professional knowledge and strengthen their skills. Such officers have broader tactical and specialized knowledgeability and a higher level of competence in staff activities.

When we speak of the competence of staff officers, we mean first and foremost a high degree of professionalism, job competence and efficiency, the ability correctly to gain one's bearings in a situation and to reach appropriate conclusions. It is precisely the ability to draw correct conclusions, not the enumeration of already-known data which distinguishes a high level of staff officer proficiency. This must be taught and learned. A high level of staff officer competence means the ability to draw up documents quickly and in a high-quality manner, accurately to evaluate air combat actions, and the ability precisely and promptly to communicate orders and instructions to subordinates. A high level of staff work competence should characterize each and every air headquarters staff officer. More than a century ago F. Engels wrote that "nowhere does officer incompetence do so much harm as in staff service." This statement is valid today as well.

The staff officer's professional competence is grounded on a high level of preparation in military theory, ideological maturity, and moral-political conditioning. Profound knowledge of Marxist-Leninist theory, Communist conviction, and awareness of his military duty help him successfully solve tactical problems. The quality of the tactical proficiency of subunit and unit personnel depends entirely on the level of preparedness of aviation headquarters staff officers.

Well-conceived drills and thoroughly-elaborated tactical air exercises provide the opportunity for combat aviators to increase their skills. Unfortunately instances of unnecessary situation simplification and excessive attention to form with consequent detriment to content still occur in tactical training; it sometimes happens that preparations for squadron tactical air exercises are at an inadequate methodological level. Flight personnel devote little attention to study of Ground Forces tactics, combat formations and capabilities, and disposition of air defense in various types of engagement. These items in turn are not always considered in preparing methods materials for a tactical air exercise, while a tactical scenario of the subunits with which aviation personnel will be working in coordination and for which they will be working is not provided, and if it is provided, it is presented in a highly simplified manner. As a result the situation loses its sharpness, and the squadron commander or pilot can transfer nothing over from such methods documents as, for example, a map to the flight operations chart, and consequently cannot correctly estimate the situation, precisely determine the mission, formulate a plan and specify a timetable.

In the last training year I took part in a combined ground and air forces exercise. The exercise was held in an instructive manner. While providing air support to ground troops, the helicopter gunship and fighter-bomber subunits operated in a coordinated manner. The aircrews of the squadron under the command of Maj V. Plyaskin performed missions in a precise, prompt and timely manner in support of motorized rifle subunits operating on the main axis of advance. The helicopter pilots attacked their assigned targets without a pause and successfully accomplished live firings of antitank guided missiles.

In the course of the exercise the exercise director decided to land a two-helicopter element onto a site adjacent to a command post. After landing, the

aircraft commanders -- Maj V. Chernyshev and Capt I. Dudarev -- entered the command post. The senior-level officer asked them to give a situation briefing from their charts. Unfortunately the pilots' charts contained nothing except for the designated line of contact and route of flight; no alternate targets were designated, and the helicopter crews had in fact not prepared to strike alternate targets. Naturally they were unable to provide a situation report.

Who is to blame for this? First and foremost, the squadron and unit headquarters staff. The executive officer, under the commanding officer's supervision, should prepare the tactical background of an air exercise (graded drill) and check preparation of aircrews. He should give them a pre-mission briefing on the latest situation data, check preparation of maps and charts, refine and detail primary and alternate targets, and make sure that every aircrew clearly understands the tactical background and range target layout, procedure and sequence of teamwork and coordination with supported subunits and other air component forces, as well as possible battlefield situation changes. Practical experience indicates that deficiencies in such matters become one of the factors involved in unnecessary situation simplification, reduce the instructiveness of an exercise, and directly affect the mood and attitude of aircrews and accomplishment of assigned missions.

In order to avoid shortcomings in tactical training of aviation personnel, it is essential to incorporate active forms of teaching into the training process. Drills and seminar classes, group drills, brief exercises, training conferences, independent study, and tests make it possible to utilize training time with maximum return on effort and help reinforce knowledge. Of course each officer should apply acquired knowledge in practice. Naturally all training drills should be of a cognitive nature and present new data. Repetition of that which is already known diminishes interest in studying tactics. Personal monitoring of such training activities by the commanding officer or his executive officer makes it possible specifically to see and evaluate the level of professional competence of subordinate officers and to assign them tasks for independent actions.

The work experience of the staffs of vanguard aviation units indicates that headquarters exercises enhance the professional tactical proficiency of officers. They can be combined or separate, but in any case they are integrally linked with the specified forms of training and, most important, make it possible to prepare in a high-quality manner to accomplish the tasks of a forthcoming tactical air exercise. Supplementary or partial drills can also be organized and held prior to an exercise. While at combined and separate headquarters drills officers improve their skills in collecting and analyzing situation data and in preparing input data for decision making and preparing combat documents and in working with means of combat command and control, supplementary or partial drills pursue the aim of improving specific skills in the performance of job duties.

In preparing for an exercise it is very important correctly to determine tasks, to set up a scenario elaboration team, and to designate a supervisor and executing personnel. This will make it possible to increase the personal responsibility of officers for the quality of their labor and to give them incentive to

improve their tactical proficiency. This will unquestionably help them acquire skills in research activities.

To improve the tactical proficiency of officers, it is essential continuously to update and renovate training facilities. In our vanguard aviation units special classrooms have been set up under the direction and with the participation of staff officers, classrooms for teaching Air Forces and Ground Forces tactics, tactics of one's own and other component aviation forces, training in reconnaissance and intelligence gathering, and electronic warfare, which help aviation personnel acquire and increase requisite knowledge.

The experience of air exercises and drills indicates that today's combat is highly dynamic, and is characterized by rapid situation change, large scope and diversity of weapons employed. In such conditions it is no easy matter precisely and continuously to control air subunits which are operating in close coordination with ground troops and naval forces. To achieve this, officers should possess well-developed tactical thinking ability and the capability quickly to make intelligent decisions and to act with initiative.

And yet frequently a standard scenario is clearly evident in the plans for conduct of an exercise or training drill, while scenario instructions for intensifying the situation are of a random nature, and the target situation is repetitive. This attests to the fact that staff and services officers as well as aircrews have become accustomed to operating in the old way and make no effort further to develop their breadth of tactical knowledgeability. Sometimes commanders or senior-level officers excessively closely supervise subordinate officers at exercises and even make decisions for them. As a rule this occurs at the most difficult and instructive moments of an exercise or training drill. This unquestionably in no way helps improve officers' independence or develop their initiative and ability to analyze a situation. One must bear in mind that in actual combat there will be no such opportunity. This is attested by examples from exercises where aviation personnel, operating over unfamiliar ranges, have received low marks.

Tactics is a powerful, effective weapon of the combat aviator. But it develops as theory and practice of conduct of combat in conformity with improvement in weapons and equipment and in turn exerts influence on the combat training of personnel. As USSR Minister of Defense MSU D. F. Ustinov stated, "new weapons enable one to deliver reliable effective fire on the adversary, permit continuity of advance, the element of offensive surprise and swiftness, constant combination of fire and maneuver, a high degree of stability and aggressiveness of defense." Thus it is impossible successfully to conduct combat operations without modern tactics. It is a matter of honor for commanders and staff officers who are profoundly aware of their responsibility for the security of our country constantly and continuously to improve the tactical proficiency of officer personnel and to maintain a high level of vigilance and combat readiness of subunits and units.

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## CIVILIAN READER VOLUNTEERS OPINION ON AIR COMBAT TACTICS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 8-9

[Article, published under the heading "In Response to Our Articles," by A. Gandraburov: "Nobody Is Indifferent"]

[Text] Discussion of an article by Col B. Belyayev entitled "Two-Ship Element or Single Aircraft?" (AVIATSIYA I KOSMONAVTIKA, No 11, 1981) evoked interest not only on the part of aviation people. It has been more than a year now since we published a summary article, but the editors are continuing to receive letters from readers interested in the development of aviation equipment and tactics.

The following was received from A. K. Gandraburov, a teacher at the Mogutnyanskaya 8-Year School.

My name carries no weight in aviation. I am purely a civilian, but I have always been interested in matters pertaining to development of aircraft equipment, tactics, and weaponry. This knowledge enables me to discuss these topics fairly knowledgeably with my students and to disseminate advances in Soviet aviation. In particular, I closely followed the debate on the article "Two-Ship Element or Single Aircraft?" I shall state frankly that I had my own opinion on this question, which was reinforced after reading the summary article, entitled "Taking Combat Missions Into Consideration."

Hero of the Soviet Union and Honored Military Pilot USSR Col Gen Avn S. Golubev summed up the debate on an important question pertaining to air tactics. In my opinion he scientifically substantiated a modern approach to tactical employment not only of a two-ship element but of an entire air system. His statement: "A two-ship element is not only a fire and tactical unit, but also an organizational structure, behind which stands a system of organization, support, control, and training" in general terms explains the title of the summary article.

Rejecting all subjective debate premises, the author pointed out that the Soviet military aviation system is grounded on the invincible strength of an innovative collective. Without detracting from the personal merits of the pilot, his ability and tactical knowledgeability, and his desire successfully to accomplish the mission, he convincingly demonstrates that on the one hand the combat pilot is an executing agent, inasmuch as the equipment is designed and built for him, and

he is directed from a command post (his success is the success of the entire collective, of the entire aviation system), while on the other hand, taking into consideration the experience of the Great Patriotic War, he stresses that Soviet pilots always were creators of tactics, that there is no room for complacency when it is a matter of combat employment and training methods. And one must agree with this argument.

The author takes into consideration the enormous role played by ground observers in formulating tactics of aerial combat during the war. At the time tactics developed in conformity with combat missions pertaining to defeating the fascist hordes. The Soviet air system proved to be extremely mobile, which enabled it victoriously to crush Hitlerite Germany's advanced capitalist military aviation system. The Soviet falcons fought the fascist air aces with great heroism! Unfortunately, however, they encountered great difficulties during the initial period of the war, until such time as we had fully formulated a rigorous aviation system on the basis of coordination of all elements and services, with formulation of tactics of fighting for air supremacy.

Col Gen Avn S. Golubev also reached conclusions from the doctrines of the Pentagon bosses that U.S. military theorists are counting heavily on airborne vehicles carrying nuclear weapons. I should like to emphasize at this point that the low-flying cruise missiles which the NATO countries have adopted represented a particular danger, for if they are launched, it will be necessary to down them during the initial phase of flight. The author of the summary article, having analyzed the military operations of the opposing aviation systems during the war in Vietnam, noted that tactics of the single attack pass in air combat failed to stand up to the test: in addition to missiles, fighters should be armed with close-combat weapons -- cannons. The belligerents gained experience in tactical coordination between pilots in a two-aircraft element, as well as between pairs of aircraft in a group. The role of the tactical control officer who, observing airspace with the aid of ground radar, informed the flight leader on the air situation in a prompt and timely manner and gave him appropriate instructions, also became enhanced.

Reporting on qualitative changes in the professional training of aviation personnel within the U.S. aviation system, the author warns that in order to gain air supremacy following missile strikes from standoff distances, fighters may proceed to close-range maneuver combat, where the two-aircraft element will constitute a fire and tactical unit.

Possessing a wealth of experience, Comrade Golubev advises commanders to train pilots with emphasis on development of their tactical thinking, and there is obvious logic in this, since the brief duration of an air engagement demands maximum efficiency of the fighter pilot. Thus he not only scientifically summarized the debate "Two-Ship Element or Single Aircraft?" but also pointed to the future development prospects of our aviation system, for which I heartily thank him.

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## MORAL ASPECTS OF COMPETITION ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 10-11

[Article, published under the heading "From Party-Political Work Experience," by Lt Col G. Ryabokon': "The Moral Aspect of Competition"]

[Text] At a tactical air exercise many of the pilots and aviation engineer service specialists of the squadron under the command of Lt Col A. Royev displayed a high degree of military skill, a mastery of weapons and combat equipment, and displayed persistence and a will to win. The subunit received a high mark. Outstanding performances were commended on the spot. The radio newspaper and combat news sheets related their achievements.

Success is predetermined in large measure by the fact that squadron command personnel, political workers, party and Komsomol activists attach great importance to socialist competition. The pilots compete with one another in achieving high marks for gunnery at air and ground targets and in skillful intercept. The overall grade is made up of the performance marks on each element of an air mission. Everything is taken into consideration -- from readying the combat pilot for the mission to his return to the field. Ground maintenance technicians compete in exemplary aircraft servicing and maintenance and in shortening the time required to turn aircraft around to go out again.

Principal attention is focused on improving the quality of tasks performed and more efficient utilization of equipment and work time. Precisely this approach to organization and conduct of socialist competition was discussed at the June (1983) CPSU Central Committee Plenum. An innovative approach to things precludes excessive attention to form and compels each and every aviator to adopt personal pledges with a greater sense of responsibility and greatly enhances the spirit of competition in training activities and flight operations.

The people in the squadron are well aware of the indoctrinal role of military labor and realize that it is fully manifested only when labor is reliably reinforced with measures which heighten the moral-political attitude of personnel.

This party demand, which is reflected in the decisions of the 26th CPSU Congress, the June and December (1983) CPSU Central Committee plenums, is being implemented.

Commending those who achieve the best performance results, commanders fully utilize the authorities given them by regulations: they present commendations, award certificates of merit, etc. Such a form of reward as honoring competition leaders and awarding pennants and challenge prizes has proven quite effective.

"All this arouses in people a feeling of gratitude for the high assessment of their labor," states political worker officer V. Gruba. "Each individual feels that his efforts, initiative, and persistence have been noted. This inspires a person and infuses one with energy. This is one of the reasons the men compete enthusiastically for the title of best in occupational category."

Socialist competition screens are displayed at prominent locations in the squadron, and the results of each flight operations shift for the week and month are displayed regularly and specifically.

The center of competition has shifted over to the aircrew. Aviation personnel are keenly aware of their role in meeting common pledges, are familiar with intermediate performance levels, and picture end results. The guiding hand of the commander, political worker, and squadron Communists is felt in all things. They seek to ensure that the pilots are thoroughly familiar with what performance indices they must achieve to receive a mark of excellent, for piloting technique in the practice area, intercept, and missile firing, for example.

At practice drills pilots, aircrews, and flights compete in precise and efficient performance of operations. The flight commanders, in organizing a drill on the equipment, give each individual specific instructions on what to practice and specify the timetable, and they closely monitor execution of their instructions. As a result in this squadron errors in flying technique and near-accident situations have been reduced to a minimum. At the end of a flight operations day the squadron commander determines which flight did the best job of accomplishing the scheduled flight operations, and which crew did the best job. The flight commanders and group chiefs in turn grade the performance of each airman. Results are promptly communicated to all personnel. Everything is in plain view, as they say, and each individual wants the performance of his competition rival to be accurately graded.

The party organization greatly assists the commander in boosting moral incentives and effectiveness of competition. The squadron deputy commander for political affairs, military pilot 1st class Maj Ye. Shcherbak, and party bureau members officers A. Filippov, V. Neykovskiy, and L. Kuts promptly inform the men of competition results for the flight operations day. Toward this end they employ news bulletin leaflets, printed newsflashes, wall newspaper, and short talks between activists and aviation personnel.

The news sheet dedicated to Sr Lt Tech Serv V. Konovalenko, for example, related how this officer shortened the time required to perform a given operation, while still maintaining excellent work quality. His comrades gained many useful tips from this report. Such praise for his labor served as a moral incentive to Konovalenko. He began working even more assiduously. At his own initiative he proceeded to share his experience and know-how with the younger maintenance technicians.

In allocating tasks, critiquing flights, and totaling performance results the squadron commander and his deputies not only use the total number of hours logged, the total number of executed drills and exercises, and marks received. Considerable attention is devoted to analysis of how a given aviator achieved success in accomplishing an assigned training mission, displaying initiative, effort, diligence, and persistence. Outstanding performers are commended on the spot. Frequently prizes and certificates are awarded to the best pilots, maintenance technicians, and mechanics right at the airfield. The labor of specialists 1st class officers N. Chaplitskiy, V. Romashin, Yu. Gribkov, and warrant officers M. Korchin and S. Andrianov has recently been commended.

Letters to parents, to enterprises and schools inspire the squadron youth to new achievement levels in military labor. These letters tell of the successes of the enlisted personnel and NCOs in training and duty performance, and they give thanks for a good upbringing. As a rule each letter is read before assembled personnel. Recently letters of thanks were sent to the home town of Komsomol members Jr Sgt M. Magomedov and Pvt G. Chernetskiy. These men are excellent performers in combat and political training, high proficiency-rating specialists, and civic activists.

The men compete for the title of best in occupational specialty and for the privilege of having one's picture taken with the unit's unfurled colors. Pfc N. Nuretdinov, Pvts I. Mezhevov, M. Dzhurayev, and others have earned this coveted privilege.

Unity of word and deed. This moral formula perfectly conveys the indoctrinal significance of socialist competition and its role in forming an active experiential posture on the part of the sentinels of the Soviet skies. It is the intention of this vanguard squadron to support lofty patriotic bursts of enthusiasm with deeds, to reinforce plans with specific achievements in training and performance of duty. Moral incentives here have become a unique generator of effectiveness of socialist competition being conducted under the slogan "Be alert, in a state of continuous readiness to defend the achievements of socialism!"

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COMMANDING OFFICER OF KHARKOV PILOT SCHOOL LAUDS TRADITIONS, TRAINING EFFECTIVENESS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 10-11

[Article, published under the heading "Military Educational Institution Affairs," by military pilot 1st class Maj Gen Avn D. Basov, commanding officer, Kharkov Order of the Red Star Higher Military Aviation School for Pilots imeni Twice Hero of the Soviet Union S. I. Gritsevets: "Traditions Call...."]

[Text] A broad, straight street bearing the name of Hero of the Soviet Union Sergey Tarkhov extended across the military post.

This intrepid Soviet pilot fought only 9 days in the flaming skies over Spain. He took to the air 21 times, and downed five fascist aircraft. The men of the Republican fighting forces called him Captain Antonic. He sustained multiple wounds in his last engagement with the enemy, but he refused to withdraw from combat, carrying out his internationalist duty to the end.

Young men who have arrived for the purpose of enrolling in our school pass along Tarkhov Street. Lieutenants, who have received parting words admonishing them to be worthy of their predecessors, to preserve the fame and honor of their school, and to remember those who taught them the profession of the intrepid and who entrusted to them a sacred cause -- to defend the homeland -- pass along it as they leave to begin their careers.

The busts of graduates of this school who are twice Heroes of the Soviet Union stand on pedestals along this street. A bust of this country's first twice-honored Hero of the Soviet Union, S. Gritsevets, whose name the school bears with honor, stands in front of the administration building.

A graduate of the Orenburg Flight School, Sergey Ivanovich Gritsevets fought bravely in the skies over Spain. He downed 30 fascist aircraft in 100 days of combat. In February 1939 he was awarded the Order of Lenin and the Gold Star Medal. He subsequently took part in savage clashes with the Japanese militarists on the Khalkhin-Gol River. During combat a machinegun burst set into flames the aircraft flown by regimental commander Maj V. Zabaluyev. The pilot parachuted from his burning aircraft and came down behind enemy lines. Risking his own life, Gritsevets landed his I-16 on the site where Zabaluyev had landed,

helped the regimental commander squeeze into his cockpit, and took off before the very eyes of the flustered Japanese. Soon the intrepid pilot was awarded a second Gold Star.

Outstanding traditions have been established in the school's more than 50-year history. Our graduates have consolidated and added to them in combat against our enemies. 230 persons have been awarded the lofty title Hero of the Soviet Union, ten of these were twice awarded the title, while famed Soviet air ace, presently Col Gen Avn Ivan Nikitovich Kozhedub, was awarded it three times. The graduates of this school include seven Soviet pilot-cosmonauts and 11 test pilots. 30 of our graduates performed aerial rammings during the war, while 4 of them -- pilots P. Guzov, A. Dobrovolskiy, N. Kozlov, and I. Meshcheryakov -- accomplished this feat twice. Eleven glorious air warriors performed the same immortal feat as the crew of N. Gastello. Five graduates, by order of the USSR minister of defense, have been permanently entered on the rolls of military units.

Many pilots and navigators who graduated from this school at various times have been awarded the honorary titles USSR Honored Military Pilot and USSR Honored Military Navigator for meritorious accomplishments in mastering aircraft and for excellent results in training and indoctrination of flight personnel. Thousands of young men were trained at this school and have honorably justified the concern, attention and affection on the part of commanders and political workers, teaching faculty and instructors.

A three-story building dating from before the war stands on Sergey Tarkov Street -- the officer cadet club. A school history museum was established in one of its rooms. It has been in operation for 20 years now. Here officer cadets meet veterans -- famed pilots and aviation commanders -- while schoolchildren become acquainted with the history of this school and learn about the heroic deeds of its former students. The museum has been visited by more than 150,000 persons. The visitors' book contains comments written by top military leaders, world-famous pilots and cosmonauts. "I have strong feelings for the place where I was developed and nurtured, where I was taught to fly a combat aircraft with skill. I am proud of the history of this school and the great labor of its illustrious staff. 3 September 1974. Three times Hero of the Soviet Union Col Gen Avn I. Kozhedub." "I have always felt emotion and gratitude toward all those who started me on my flying career. Many thanks, dear workers. 17 June 1976. Twice Hero of the Soviet Union USSR Pilot-Cosmonaut A. Leonov." There are many such entries.

They are constantly upgrading and adding to the museum exhibits. Museum materials include many descriptions of deeds performed by our graduates.

...In the fall of 1941 an aircraft piloted by N. Svitenco was disabled by anti-aircraft fire while attacking an enemy troop column. One of his men, A. Slonov, landed his own "Chayka," picked up his commanding officer, who had made a forced landing, and took off again under heavy mortar fire.... Today Maj Gen Avn (Ret) Nikolay Ivanovich Svitenco resides in Kharkov. He is a frequent visitor at the school; get-togethers with him are always joyous and welcome. This combat veteran does a great deal of military-patriotic work.

Not only did subordinates rescue their superiors, but commanders also rescued their pilots. The fascists disabled an aircraft flown by F. Demchenko in a savage aerial battle at Stalingrad, over the Morozovskiy rail junction. He made a forced landing behind enemy lines. Regimental commander A. Semenov was apprised of this fact upon returning from a combat mission. He immediately climbed into a Po-2 and took off to search for the downed pilot. Risking his own life, he landed alongside Demchenko's aircraft, picked the pilot up, and carried him back to their home field.

Every year the members of the current graduating class of newly-commissioned officers and pilots leave for their line-unit assignments. They are replaced by young men who have made the decision to dedicate their lives to fighter aviation. The commanders and political workers, faculty members and flight instructors dedicate all their knowledge, experience, inspiration, and teaching skills to their training and indoctrination. Flight training is a most important component of the training program. Numerous comments received from the line units confirm the fact that most of our graduates show a high level of proficiency and excellent moral-political and professional qualities. This is a result of constant improvement of methods of teaching theory and flight training, forms and methods of indoctrination work. The school authorities, political section, and party organization devote unabating attention to work with faculty and flight instructor personnel as well as subunit commanders. Efforts are directed toward ensuring that the indoctrinal influence on student personnel by educators of all categories are precisely coordinated. Only with this condition is it possible to accomplish the assigned tasks in a methodologically competent manner and with maximum effectiveness.

Training theory and flight training methods conferences are regularly held at this school, and scientific research is regularly conducted, directed toward improving the forms, methods and techniques of training and indoctrinating officer cadets. Officers in the flying methods and flight training sections are constantly working on these items.

No matter how sophisticated elaborated methods and recommendations may be, however, they will not play their intended role if executing personnel lack skill, volition, and determination. This is why work with pilot-instructors is always at the center of attention. All aspects of the activities of pilots, teaching faculty and subunit commanders over the preceding five years have been thoroughly studied in the training subunits with a view to interlinkage. Analysis of advanced know-how as well as revealed deficiencies has made it possible to improve teaching methods and formulate new theses. It has been noted, for example, that the best results have been produced by pilot cadets in second and fourth-year flying groups, where pilot-instructors were not changed. They reached the natural conclusion that it is advisable to assign a flight group to an instructor from the first year and not to replace him without extreme necessity.

The recommendations of the psychophysiological laboratory (PFL) and the people in charge of ULO [Flight Training Section] simulator training are more fully taken into consideration in assigning young officer cadets to groups, so as to ensure that cadets who are strong, average, and weak in flying ability are

assigned to each group. Such an assignment pattern makes it possible more precisely to regulate the sequence of permitting pilot cadets to commence training activities and to utilize available aircraft more efficiently. The result was an increase in average number of flight hours logged. If a pilot cadet is unable to complete some phase of training in a given year, it is individually scheduled for him in the following year.

At this school we endeavor to ensure that during the course of training our officer cadets not only acquire solid knowledge and skills but also skillfully apply them in their work in the line units. Therefore considerable attention is devoted to instilling excellent political, professional and moral qualities in them, a readiness and willingness honorably to defend our nation's airspace. Experience has shown that military-patriotic indoctrination of officer cadets and instilling such qualities as stick-to-it-iveness, faithfulness to duty, and the ability to concentrate one's will in the main area of emphasis must commence from the time they first arrive at school, and this effort must be conducted aggressively and persistently. Total coordination in the actions of teaching personnel of all categories is particularly essential precisely at this stage. Training handled in this manner made it possible last year to cut in half the percentage of officer cadets dismissed for failure to meet standards of achievement in theoretical study, for lack of discipline, or unwillingness to continue their studies.

The method of problem teaching is gaining a solid position for itself in the training process in the departments of the Flight Training Section. Candidate of Technical Sciences Col G. Rayevskiy, Cols A. Kudikov, A. Belubekov, A. Dunakovskiy, V. Aleynov, I. Shcherbakov, V. Glukhov, and others are aggressively pushing this method. A scientific-practical conference was held by the section, based on experience in adopting this method into the training process. Many instructors reached the unanimous opinion that this promising method, when skillfully utilized, can produce an appreciable effect in training officer cadets. The conference helped devise teaching-methods aids on problems teaching in the social sciences and specialized subjects. Improvements were made in training facilities, and technical teaching devices are being efficiently utilized. The best job in this area is being done in the departments of Marxism-Leninism, tactics, and aerodynamics.

Training and indoctrination is a unified and indivisible process. All command-political personnel, teaching faculty, and flight instructor personnel take part in this process. Not only pilot-instructors but also teaching faculty and subunit commanders work actively with the young aviators during pilot cadet flying activities at the airfields. A unity of theory and practice finds genuine embodiment on the ramp and on the active runway, in the tower and in the cockpit. In this atmosphere future combat pilots develop a genuine love of their profession, and their characters become toughened.

There are many officer cadets at the school who by their serious attitude toward their studies have gained a great deal of respect from their fellow students and instructors. They include officer cadet Igor' Solov'yev, son of an honored Soviet test pilot. This graduate of the Moscow Aviation Institute already had rich career opportunities, but this lad decided to tie his future more closely with aviation, and enrolled at our Kharkov school. Modest,

hardworking, and totally devoted to flying, he offers a fine example to his comrades in all things. Officer cadet Anatoliy Omel'chenko, son of a kolkhoz farmer from Poltava Oblast, is equally outstanding. From his arrival at this school the lad has shown himself to be diligent, hardworking, and filled with initiative. Commanders and political workers, faculty members and pilot-instructors have high praise for his success in theoretical and practical training. Officer candidate V. Kashikov, delegate to the 19th Komsomol Congress, excellent-rated officer candidates S. Fastovets, A. Alekhin, and others are working persistently to master their aircraft. Most graduates are party members when they leave school to report to their duty assignments.

Pilot-instructors Lt Yu. Sologub, Sr Lts V. Trushin, Yu. Patsekula, N. Diodritsa, and Capt P. Yesipov skillfully train and indoctrinate their men. Their groups usually are among the first to complete the dual instruction program, and with excellent quality and a minimum number of dual-instruction flights. Many of the instructors are young both in years and work experience, but they are the equal of their senior comrades in results.

The school administration and political section maintain constant contact with the units in which our graduates are serving. We carefully study and analyze comments received from these units and consider both positive and negative points. We regularly hold meetings of the school council as well as department meetings for this purpose. Decisions on specific items are reached at these meetings. It was noted in comments received 2 years ago, for example, that certain graduates did not adequately possess command skills, were experiencing difficulties in the conduct of party-political work, while some individuals had been put on report for lack of discipline. This forced us to give serious thought to teaching and indoctrination methods and prompted us to seek ways to improve methods. Adopted measures have produced positive results.

For a long time now negative comments have not been received about the students of some of our instructors. Take, for example, cadet battalion commander Col K. Grachev. This commanding officer has proven to be a fine methods expert and possesses profound knowledge of education science. He served for many years on various staffs and in command slots, and has amassed a wealth of experience. Relying on this experience, the battalion commander precisely distributed duties among his officers. Work with individual cadets is organized in a methodologically correct manner in the subunit, there is no excessively close supervision over subordinates, interrelationships as prescribed by regulations are clearly defined, the lower-echelon commanders enjoy a high degree of respect, and party activists are doing an active job.

Exemplary observance of regulations has been secured in the company under the command of Maj A. Shatilo. Based on competition results, for the last 2 years now this company has kept a solid hold on the award named after twice Hero of the Soviet Union A. Klubov.

Matters pertaining to developing in officer cadets the qualities needed by an aviation commander are regularly discussed at party and Komsomol meetings and at training methods conferences of pilot-instructors, cadet platoon and company commanders. The school administration and political section concern themselves constantly with ensuring that officer cadets take active part in

party-political work. The advanced-level cadets hold talks, political instruction classes, present political briefing sessions, and surveys of newspapers and magazines.

This school has a rich history and solid, fine fighting traditions. Our officers consider building on these traditions and educating reliable defenders of the achievements of the Great October Revolution to be their highest professional and party duty.

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## AIRCRAFT OVERHAUL PLANT WORKS TO IMPROVE OPERATIONS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 14-15

[Article, published under the heading "Implementing the Decisions of the 26th CPSU Congress," by Lt Col (Ret) I. Stupak, aircraft overhaul enterprise party committee secretary, and V. Doronin, engineer in economics education: "The Outfit Is Renowned by Its Labor"]

[Text] It was emphasized at the 26th CPSU Congress and the June (1983) CPSU Central Committee Plenum that the countenance of every society is determined in the final analysis by the level of development of its productive resources, by the character and state of production relations. It was stated at the Plenum that in our societal development we have now reached a point in history where profound qualitative changes in productive resources and corresponding improvement of production relations have not only become imminent but have also become inevitable. An important role in this is assigned to workforces.

The CPSU Central Committee Decree entitled "On Further Development and Increased Effectiveness of the Brigade Form of Organization of Labor and Labor Incentive in Industry" stresses that they play an important educational role in conditions of developed socialism. Enjoying extensive rights which are formally spelled out in the USSR Constitution and in the USSR law on workforces and enhancement of their role in management of enterprises, establishments, and organizations, workforces are becoming an increasingly more effective building and indoctrinal force, which actively influences the production and societal activities of the toilers. The entire multifaceted nature of societal affairs is not simply refracted in their activities; they themselves function as creators of material and spiritual goods, organizing, unifying, and inspiring people, shaping their political consciousness, their moral countenance, their way of thinking and acting. Practical experience attests to the fact that the more purposeful and able is the guiding nucleus, the soul of the workforce -- primary party organizations -- the more fully the workforce shows its worth.

At our aircraft overhaul enterprise, which is directed by Engr-Col V. Koshovnik, the primary party organization and party groups operate in the very thick of the toilers and mobilize them to accomplish assigned tasks. Thanks to harmonious joint efforts by Communists, Komsomol members, and trade-union activists, plan targets are being successfully met, for which our outfit has been awarded the

Badge of Honor of the CPSU Central Committee, USSR Council of Ministers, All-Union Central Trade Union Council, and the Komsomol Central Committee.

A powerful impulse toward unification of our workforce and increased labor effectiveness was generated by a visit to the enterprise by USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo. During the get-together workers and employees assured Comrade D. F. Ustinov that the tasks they have been assigned will be successfully accomplished. And they have kept their word. The enterprise has four times been awarded a challenge Red Banner of the USSR Ministry of Defense and Central Committee of the Trade Union of Aviation Workers for meeting the plan targets of the first three years of the 11th Five-Year Plan.

A substantial contribution toward accomplishing the production plan targets is being made by the men of the engine testing shop. I should like to discuss it in greater detail. The shop is headed by experienced, politically and technically knowledgeable supervisors: shop superintendent party member Ye. Chirikov and his deputy, party member A. Potolokov. Together with the shop party organization, V. Mel'nikov, secretary, they have succeeded in forging a cohesive group. The shop party organization is genuinely functioning as the core and nucleus of the workforce. Vanguard production workers, civic activists party members N. Prokhorov, A. Yermishin, V. Bagryantsev, and S. Isaychev always come to the assistance of their comrades. Particular attention is devoted to young people. A kindly, friendly attitude is combined with a high degree of demandingness. Reports by young party members, almost all of whom have regular party assignments, are presented at meetings and buro sessions. It is not surprising that the shop has been repeatedly announced the winner based on results of intraplant socialist competition, as well as of competition in honor of the 25th anniversary of the movement for a Communist attitude toward labor.

Success did not come at once. Organization of the work activities of the brigades engaged in testing engines presented particular difficulty. And yet it is precisely they who determine the end results of the labor of the entire shop. The fact is that the previously existing method of record keeping did not always accurately estimate the specific contribution of this small group of 6 or 7 persons to overall performance results. This led to disagreements between brigades, because cases occurred where persons who achieved better results were rewarded on an equal basis with those who had an insufficiently conscientious attitude toward their duties. The situation was further complicated by difficulty in record keeping on work pertaining to testing engines, as well as other no less important jobs which were not directly linked with production.

In order to establish correct, objective record keeping, to provide incentive to personnel and to unify them, shop supervisor-Communists proposed that norms be set for all categories of jobs performed by the engine testing teams and that appropriate standard units of output be specified. All shop workers and employees took active part in this project.

Brigade labor performances began to be determined from the total number of standard output units, which form the basis of socialist competition indices. Results were totaled up each month by the shop supervisors and shop committee. Members of the party committee and party buro took part in the preliminary computation of standard output units.

Nevertheless it was ascertained with time that all job categories could not be fully norm-specified, since a portion of the output from other shops is received with defects. One brigade receives such parts, while another one does not. The form of material incentive reward also remained inadequately precise.

At this point the enterprise authorities and party committee, jointly with management and shop party and trade union activists decided to increase the bonus paid from the material incentive fund, but under the condition of bonus differentiation in relation to results of labor and within limits of 5 to 25 percent.

The following question arose upon adoption of this system of remuneration: should bonuses be paid separately to each brigade which has achieved maximum output, or to all brigades working simultaneously in the same engine testing bay? The first version was rejected after a thorough analysis, since some teams would perform work connected principally with direct testing, while others would be performing such jobs as washing, tightening and locking fasteners, and correcting faults by other shops. It is virtually impossible adequately to quantify such jobs. As a result the evaluation estimate of the labor of a given team might not always be objective.

Approval was given to a variation whereby monetary reward was paid to brigades working in the same bay and completely performing all procedures pertaining to engine testing and turning over a completed job. Since this increased personnel material and moral incentive, work performance results began to be totaled up every 10 days. This procedure had a positive effect. Assigned tasks and progress in carrying them out became more clearly apparent. There was greater incentive for people to do efficient and high-quality work. Lagging workers strove to improve to the level of leading performers. Prior to adoption of the new system of labor evaluation and remuneration, for example, the average monthly output of the best brigade, led by V. Kolomiyets, was 54.4 standard units, while that of V. Khakhayev's brigade was only 36.8. Performance results for 1983, however, indicated that the outputs of both groups had risen and were now equal. Output had increased by 8.3 percent through improving the work performance of all brigades, while the total number of workers had remained unchanged. Relations between engine test bay brigades improved; brigades began more actively assisting one another.

Advanced know-how, which is becoming available to all, is regularly communicated on the brigade leaders' council. Each individual is now vitally interested in strengthening labor discipline and in an implacable campaign against drunks and loafers. The shop workforce even has parted company with proficient specialist brigade leader V. Chernetsov, who had repeatedly violated labor discipline. Thus through the efforts of management and the party organization, favorable conditions have been created in the shop for an active, fruitful work effort and effective competition.

There is no need to argue the fact that a collective is shaped in the brigade and section. It is precisely here that the plant party committee is shifting the central focus of organizational, political indoctrination work. There are more than 100 brigades at the enterprise, in which 81.8 percent of employees are working. It is precisely for this reason that strengthening of party influence in the lowest-level worker organizational units has become the main task of the party committee and the shop party buros: forming of militant party groups, and selection of propagandists and agitators. Establishment of party groups is one of the most important factors in unifying the collective. They operate wherever politics and economics are translated into the language of practical work, the primary places where people are instilled with an aggressive experiential posture, a conscientious attitude toward labor, and Communist ethics.

The party group in foreman V. Il'in's section, for example, is headed by party member V. Simonov. This is a genuine fighting party nucleus. Communists are the initiators of all new and advanced developments in the collective, which totals more than 40 persons, and generate a productive atmosphere and a healthy moral climate in the collective. At their meetings they discuss a broad range of problems, which frequently are later brought up at production and party meetings of the entire shop. Quality of work performed is of paramount importance in aircraft overhaul and repair. How can work quality and reliability of repaired and overhauled equipment be increased? These questions constantly occupy the center of attention of the party group. Meaningful suggestions and critical comments are analyzed, and specific decisions are promptly made on the basis of suggestions and comments. In addition, party group members V. Il'in, V. Dyudin and others continuously present reports on such relevant topics as economy regimen, increasing labor efficiency, improving the work of instructors, and strengthening labor discipline.

The party group plays an important indoctrinational role. Once young Communist V. Yeliseyev violated labor discipline, coming to work in an intoxicated state. They had a frank talk with him at a meeting of the party group. This violator of party and production discipline was severely censured. At the same time the members of the party group treated this individual in a solicitous manner. V. Dyudin, a party member since 1939, and other Communists spoke with him repeatedly. Today V. Yeliseyev is working conscientiously and eagerly carrying out party assignments.

The activities of the party group are producing good results, reflected first and foremost in accomplishment of plan-specified targets. Foreman V. Il'in's section is rightly considered to be one of the best in the shop. Accomplishment of plan-targeted quotas in his section is running 120-130 percent.

Active efforts on the part of party groups and their ability to accomplish tasks in a militant and aggressive manner depend in large measure on the assistance they are given by the party buro of the primary party organization and the shop supervisors. The party organization, headed by party member N. Yurin, and the shop administration, headed by Engr-Maj V. Perets, are doing everything they can to boost their authority and influence.

Nor are enterprise authorities, the party and trade union committees shutting their eyes to deficiencies and unresolved matters. Most of the brigades are scheduled to transition to operations according to the principle of coefficient of labor participation, and all shops are to be brought up to the level of model performers. The enterprise must be readied to operate on a more intensive work regimen, connected with increasing output. Matters connected with strengthening labor and social discipline and improving the quality of aircraft overhaul and repair continue to remain areas of major importance. A business-like attitude presently prevails within the workforce. This inspires one with confidence that the assigned tasks will be carried out with flying colors.

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## MILITARY KOMSOMOL MEMBERS URGED TO REDOUBLE EFFORTS

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[Article, published under the heading "Anticipating the Fifth Armed Forces Conference of Komsomol Organization Secretaries," by Maj S. Reutov, assistant chief, Komsomol Work Department, Air Forces Political Directorate, delegate to the 19th Komsomol Congress: "Word Backed Up by Deed"]

[Text] The 5th Armed Forces Conference of Komsomol Organization Secretaries will convene in a few months. It will be an important event in the life of young military personnel and an accountability report on how the Komsomol in our glorious Armed Forces is implementing the historic decisions of the 26th CPSU Congress and 19th Komsomol Congress and is accomplishing the tasks assigned to the military by the USSR Minister of Defense. The conferees will comprehensively and thoroughly analyze Komsomol work experience amassed in recent years, will draft recommendations aimed at development of initiative, activeness, and increased militance on the part of Komsomol organizations, and will discuss their contribution to the cause of further increasing the combat readiness of the Soviet Armed Forces.

The forthcoming forum of military youth is also notable in the fact that it will be taking place on the eve of the 60th anniversary of confirmation of the name V. I. Lenin on Komsomol and the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War, which unquestionably will be reflected in the conference proceedings and resolutions.

In his unified political education day report, Chief Mar Avn P.S. Kutakhov, commander in chief of the Air Forces, noted that party and Komsomol organizations play an important role in accomplishing the large and critically important tasks facing the Air Forces. Party and Komsomol organizations are active commanders' assistants in the campaign for high achievements in combat and political training. Wherever aviation combat power is forged out: in the classrooms and at the airfields, in the practice areas and on the ranges -- Komsomol-member aviators are honing their professional skills together with their older comrades. Their military labor is greatly appreciated by the party, government, and Komsomol Central Committee. More than 10 Air Forces outfits have been awarded a challenge Red Banner and Komsomol Central Committee Prize, and four of them have been entered in the chronicle of Komsomol fame. In the last 5 years more than

of new aircraft, for exemplary performance of assigned missions, and for skill displayed at tactical air exercises. They include secretaries of primary Komsomol organizations of excellent-rated squadrons: officers A. Lavrenko, A. Larionov, A. Mozhayev, V. Kuznetsov, A. Gusarov, and K. Nikitin. They, just as many other activists, have proven to be skilled organizers and indoctrinators of youth, persons who devote all their energies, knowledge, and experience to the common cause.

Air Forces Komsomol organizations have become even stronger in an ideological-political and organizational respect in recent years. Placement of activists has improved, as have results of work performance in the subunits. Positive changes in the countenance of the secretary proper -- its principal organizer -- also could not help but affect the quality of Komsomol work performance. At the present time more than half of all Komsomol leaders possess a higher education, are working skillfully and persistently to master complex aircraft, and are party ideological warriors. Typically, in the course of the most recent report-election meetings, highly-trained, respected comrades were elected to Komsomol organization leadership positions, persons who had demonstrated by deeds their ability to lead youth.

The Komsomol members of an excellent-rated squadron, for example, have repeatedly elected naval ship executive officer Sr Lt V. Gorovenko to the position of buro secretary. The squadron Komsomol organization is proving itself to be a reliable assistant to the commanding officer, is ideologically unifying the young men, and is creating in the subunit an atmosphere of innovative search and initiative. Squadron aviators initiated a movement under the slogan "Focus Komsomol concern on modern combat aircraft systems!" Activists are skillfully guiding the patriotic enthusiasm of Komsomol members toward achieving specified performance standards. They are delving deep into combat training, are responding promptly and firmly to deficiencies, are constantly concerned with ensuring exemplary duty performance by young aviators, and are seeking to ensure that each young aviator displays activeness and makes a worthy contribution to accomplishment of socialist pledges in the competition under the slogan "Be alert and constantly prepared to defend the achievements of socialism!" Sr Lt V. Gorovenko is himself well prepared in an ideological-political and military respect. This helps him pose relevant questions to Komsomol members and helps him ensure, working together with the commanding officer and his deputy for political affairs, correct placement of activists in critical areas of combat training activity.

The activities of many secretaries are currently distinguished by initiative and innovative quest, purposefulness, and the ability to isolate the main element from a great many items and to concentrate on it the attention of the collective. The fact is that every Komsomol leader encounters the most diversified, at times highly complex questions, to which sometimes there are no ready answers. It is especially important here to have the ability to make a correct assessment of events and facts in a prompt and timely manner, to accomplish fast situation orientation, and to find work forms which are effective precisely at a given moment.

The Komsomol secretary is first and foremost a young leader of young people. And since this is so, he must be for them not only a thoughtful indoctrinator but also an older comrade, who is able to give advice in a prompt manner, to listen to the opinion of others, and also frequently to give fair-minded criticism. Our best Komsomol leaders work precisely in this manner.

We must admit, however, that one still encounters Komsomol organization secretaries who ignore shortcomings and seek to avoid damaging relations with persons guilty of irresponsibility, negligence, and violations of military discipline. There are also those who merely create the appearance of alert and energetic work, while in actual fact not troubling themselves with performance effectiveness. Understandably such a duality, such a discrepancy between word and deed is censured by young people. Former Komsomol committee secretary Sr Lt Yu. Kibitkov, for example, managed sharply to criticize deficiencies from the speaker's platform, but once he came down from it he did little to improve things, and sometimes ignored the opinion of Komsomol members. It is not surprising that at the next report-election meeting they did not elect him to the committee.

The operating efficiency of a Komsomol organization is determined not only by how an elected body operates but also by how each and every Komsomol member participates in volunteer activities, for the qualities needed by an activist are acquired in the process of his constant participation in the activities of the Komsomol organization. There are a great many means at the disposal of committees and buros to involve young aviators in these activities. These means include meetings, which constitute a genuine school of indoctrination, continuing or one-time assignments, individual talks with Komsomol members, and discussions of their reports on meeting the requirements of regulations. An important role is played here as well by the secretary, who is called upon innovatively to utilize the entire diversified arsenal of means within Komsomol for the purpose of developing the sociopolitical activeness of young military personnel.

Preparations for the Fifth Armed Forces Conference of Secretaries of Komsomol Organizations is to be more fully utilized to reveal ways to achieve further increase in the activeness and militancy of Komsomol organizations and to strengthen the role of Komsomol in the affairs of aviation units and subunits. It is essential to go to the conference with sufficiently precise answers to the most critical questions pertaining to improving Komsomol work. The decisions of the 26th CPSU Congress and the tasks assigned to Komsomol in the CPSU Central Committee Accountability Report constitute the main reference point in the considerable and multifaceted activities preceding this event. These tasks consist primarily in improving Communist, military, moral, and ideological-political indoctrination of young people and creating a lively, innovative atmosphere in each and every Komsomol organization.

On the threshold of the conference it is essential thoroughly to analyze that contribution which Komsomol organizations are making toward accomplishing the missions assigned to units and subunits. It is exceptionally important to ensure, CPSU Central Committee General Secretary Comrade Yu. V. Andropov emphasized in his address at the June (1983) CPSU Central Committee Plenum, that words

never be at variance with deeds and that substance not be replaced by form. One should critically evaluate from this position, for example, what Komsomol undertakings and initiatives have not experienced further dissemination, and which ones have been tested by practical experience and time. It is important to select the most expedient of these and to concentrate efforts on their practical adoption.

For example, the Komsomol organization of a guards aviation regiment awarded a challenge Komsomol Central Committee Red Banner achieved good results in combat training. On the initiative of the Komsomol committee, headed by Gds Capt A. Tatarchenko, Komsomol crews have been formed in the squadrons. The time required to ready aircraft for departure is being substantially shortened as a result of their smoothly coordinated actions. On the threshold of the Armed Forces Congress, all Komsomol members in this regiment have adopted upgraded socialist pledges and are successfully carrying them out.

The campaign to earn the title of best youth crew has become solidly embodied in the daily routine and combat training of the Komsomol members of the guards aviation regiment in which Gds Capt A. Kulyayev serves as Komsomol committee secretary. Several times this title has been rightfully earned by the crew of Gds Capt A. Angolenko. This young Communist and the members of his crew can always be seen among Komsomol members. They readily and willingly share their experience and know-how and take active part in the conduct of youth activities.

Aggravation of the international situation and heightening of the military danger on the part of imperialism demand that Komsomol organizations more consistently achieve a higher level of heroic-patriotic indoctrination of young people. Publicity of the revolutionary and fighting traditions of the Air Forces and the relay of illustrious deeds by Komsomol members in honor of the 40th anniversary of the Victory of the Soviet People in the Great Patriotic War should be conducted on a large scale. Active work in this area is being done, for example, in the outfit in which Capt N. Ovechkin serves as Komsomol worker. The young aviators in this outfit are erecting obelisks in honor of pilot-heroes and are renovating combat glory museums.

Competition for the privilege of flying a sortie in place of a hero on the rolls of one's regiment is also a good incentive toward high-quality mastery of equipment and weapons. Dozens of young pilots are competition winners each month. Many of them have proven to be outstanding combat pilots and skilled indoctrinators of subordinates.

The aggressive intensity of military labor will unquestionably increase greatly if Komsomol organizations take more active part in forming in aviation personnel, especially youth, a new type of military-technical thinking which is in conformity with today's aircraft systems and new combat techniques. Such an effort is being conducted, for example, in the subunit in which the Komsomol organization is headed by officer V. Parkhomenko. Equipment days, contests for the title of best in occupational specialty, technical conferences, and question-and-answer evenings are being extensively organized. Various study groups are greatly assisting young military personnel in broadening technical knowledgeability. It is not mere happenstance that 70 percent of the Komsomol members in this outfit are specialists 1st and 2nd class.

The next stage of the All-Union Lenin Examination, "Implementing the Decisions of the 26th CPSU Congress!", will constitute an accountability report by each and every member of Komsomol on his personal contribution toward honoring in a worthy manner the Fifth Armed Forces Conference of Secretaries of Komsomol Organizations. This is an effective method of instilling excellent ideological-political and ethical qualities in young people. It is called upon to form a Marxist-Leninist ideological outlook, Communist moral fiber, to teach a class approach to events of political and societal affairs, to develop and instill total dedication to the ideals of communism, Soviet patriotism, and proletarian internationalism, a feeling of collectivism, readiness and willingness to defend the historic achievements of socialism.

The forming in young aviation personnel of Communist ideology, an aggressive experiential posture, teaching of faithfulness to the military oath and burning hatred toward imperialism and bourgeois ideology are directly linked to the degree to which study of Marxist-Leninist theory is organically combined with practical affairs and with active participation by Komsomol members in volunteer work. Here as well quality rather than quantity of measures is important. Therefore, alongside demonstrating the world-historic significance of the victories of the Soviet people, the great achievements and advantages of genuine socialism, there is an acute need to teach young people, particularly Komsomol activists, the ability persuasively to expose hostile propaganda and the anti-popular, misanthropic essence of imperialism, especially U.S. imperialism.

The party teaches us that specific deeds are the measuring stick of all words, regardless of how fine and attractive they may be. For Komsomol members and young people in the Air Forces this means further improvement of military skill, increased combat readiness, discipline and organization in all areas of combat training.

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## UNITED STATES ACCUSED OF MILITARIZING SPACE

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[Article, published under the heading "Imperialism -- Enemy of Peoples," by Hero of the Soviet Union Candidate of Military Sciences Maj Gen Avn L. Shishov: "Strategy of Adventurism in Space"; based on materials published in the foreign press]

[Text] CPSU Central Committee General Secretary Comrade Yu. V. Andropov noted at the June (1983) CPSU Central Committee Plenum: "...There are a great many major problems which affect every country in the world and the significance of which is steadily growing. For example, protection of the natural environment on our planet, tapping of new sources of energy, the conquest of space, and exploitation of the resources of the World Ocean." And the titanic labor of our people, the mighty Soviet economy and technology, and the talent of scientists, guided by the Communist Party, are being skillfully directed toward solving these global historic problems of mankind.

Launching of the first artificial Earth satellite by our country on 4 October 1957 and the famous flight by the world's first cosmonaut, Yu. A. Gagarin, on 12 April 1961, opened up for mankind the road into space. The Soviet Union was the first to put a satellite into orbit around the Earth, Sun, and Moon, the first to launch unmanned probes to the Moon, Venus, and Mars, and the first to launch manned spacecraft, carrying both a single cosmonaut and multiple-member crews. A Soviet cosmonaut took history's first space walk. Our country laid down the theoretical and practical foundations of a space program for peaceful purposes, for the good of mankind, and has made a substantial contribution to the development of contemporary civilization. It is precisely the Soviet Union which initiated and is a participant in all international agreements which are presently in force and are aimed at ensuring that space is utilized only for peaceful purposes.

On the other hand, the United States, especially since the Reagan Administration has come into office, has made every effort to avoid constructive, humane decisions and proposals calling for peaceful utilization of space. In a recent interview with the newspaper NEW YORK TIMES, the undersecretary of the U.S. Air Force frankly stated: "There is nothing new about military utilization of space. We have always been engaged in this."

Important U.S. politicians, members of the House and Senate, spokesmen for the military-industrial complex, officials of the Defense Department, and some astronauts are actively involved in formulating various plans, programs and experiments for military purposes. The U.S. propaganda machine is going full blast, with the participation of many bourgeois press journalists and observers.

U.S. militarist space adventurism has been manifested in a particularly sinister manner in connection with the first Space Shuttle missions. As early as 1978 a Defense Department spokesman enumerated before Congress the possibilities and advantages of these spacecraft utilized for military purposes in comparison with single-mission booster rockets.

As was reported in the U.S. magazines DEFENSE (SPACE BUSINESS DAILY) and AEROSPACE DAILY, the U.S. Department of Defense is currently planning to modify military strategic missile launch early warning satellites, communications satellites, weather, and navigation satellites so that they can be put into orbit by a Space Shuttle craft. The magazine AEROSPACE DAILY notes that testing of equipment to detect missiles and aircraft is an important area of the U.S. Defense Department space program.

U.S. reactionary circles are exerting considerable efforts to develop laser weapons and deploy them in space. As was reported by the magazine AVIATION WEEK AND SPACE TECHNOLOGY, a seminar on the current status of and prospects for employment of beamed-energy weapons was held in New York as early as December 1980. Representatives of the Pentagon and the U.S. Congress spoke at this seminar, issuing an appeal for the earliest possible deployment in space of laser stations with a broad range of combat missions. The magazine AEROSPACE DAILY reported specific plans to use the Space Shuttle for development of laser weapons.

The U.S. press is also focusing attention on plans to deploy a new, large-scale antimissile defense (PRO) system, which would utilize laser weapons. These plans are in direct contradiction with the provisions of the Soviet-American treaty limiting antimissile defense systems. The White House and Pentagon, however, would like to alter the terms of the treaty, to permit them to deploy such systems in space.

It is disturbing indeed to read a statement by astronaut Harrison Schmitt who, accompanied by astronauts Cernan and Evans, flew the Apollo 17 manned lunar landing mission. He is now advocating expanded research for the purpose of utilizing space for military purposes. As AEROSPACE DAILY reports, Schmitt criticized the Pentagon for dragging its feet on utilizing the military potential of the Space Shuttle and proposes that a military space command be established to resolve this problem. Incidentally, this "strategist" also specified the principal military missions which can be performed with the aid of the Space Shuttle.

What a striking contrast between such adventures and the humanitarian goals of Soviet science! Shortly before the Soyuz T-9 mission, spacecraft commander V. Lyakhov, who had just finished a strenuous session in the weightlessness simulation tank, was asked to comment on simulation tank experiments and the

work loads involved. Vladimir Afanas'yevich replied: "This is needed by our scientists and workers for the benefit of the Soviet people and for preserving world peace."

Recently the U.S. magazine AVIATION WEEK AND SPACE TECHNOLOGY reported that a special space system component of the U.S. Air Force had begun an extensive 10-year research program for the purpose of determining types of equipment necessary for implementation of the U.S. military space program. The magazine stated that construction is already in progress on a joint military space center, designated for collection of intelligence on a global scale, coordination, command and control of combat operations in space. A combat command and control and antisatellite weapon system test center experimental complex is also being established.

It has been reported in the press that the U.S. Air Force is building a facility for space shuttle launches and landings. Construction is in the completion stages on space center buildings and equipment for handling space shuttle missions for the U.S. Defense Department.

Thus the Pentagon is displaying feverish activity to accomplish total militarization of space and is formulating a strategy of space adventurism. And a NEW YORK TIMES commentator notes quite correctly that from the very beginning the Space Shuttle was intended primarily for military missions, for if it were to be used only to fly scientific and commercial missions, the U.S. Government would not have invested such enormous amounts of money in the program to develop the Space Shuttle. The commentator emphasizes that the United States has extended the arms race into space.

Generous appropriations by the U.S. Administration in office attest to the scope of the strategy of adventurism in space. The Pentagon's "cosmic" budget, reports the newspaper LOS ANGELES TIMES, has soared to 7.4 billion dollars to date. The magazine BUSINESS WEEK writes in this connection that in the last 20 years the United States has spent an astronomical amount on military space programs -- approximately 50 billion dollars.

In March 1983 Reagan, presenting a verbose statement at the White House on U.S. military policy, declared that his administration will be preparing to wage war in space and that this allegedly pursues the goal of "strengthening U.S. security." Not all Americans, however, support the President in this matter. And no matter how much the Pentagon and CIA try to conceal their sinister plans to militarize space or to justify them with an alleged "Soviet threat," this frequently results in vociferous protests and enormous displeasure on the part of the vast majority of Americans. Protest demonstrations and strikes at aerospace industry plants and companies offer graphic confirmation of this.

As we know, a group of U.S. scientists and public-spirited citizens sent a telegram to CPSU Central Committee General Secretary Comrade Yu. V. Andropov, chairman of the Presidium of the USSR Supreme Soviet, condemning the militarization of space and containing an appeal for the banning of space weapons. In response Comrade Yu. V. Andropov clearly stated that prevention of the militarization of space is one of the primary problems facing mankind and that a great

deal here on Earth depends on whether it is resolved. He emphasized in his September 1983 Declaration: "Freeing of material resources being senselessly spent on the arms race, and revelation of man's inexhaustible creative potential -- this is what can unite people, and this is what should define the policies of nations as the 20th century draws to a close. In order for all this to be accomplished, it is necessary to halt the forces of militarism and through joint efforts to keep the world from slipping into the abyss."

The Soviet Union is doing everything necessary to accomplish this. Vivid evidence of this is our new peace initiatives, and particularly the proposal calling for an international treaty banning the use of force in space and against Earth from space. The USSR has declared that it is prepared to enter into a radical solution to the problem of antisatellite weapons, and has pledged not to be the first to put into space any types of antisatellite weapon. Thus, as was emphasized by USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, in an article entitled "Campaigning for Peace and Strengthening Defense Capability," which appeared in the newspaper PRAVDA, "the USSR has proposed to the United States that offensive weapons not be deployed in space and is waiting for a reply from the United States. If a response is not forthcoming, we cannot simply ignore U.S. intentions to turn space into a theater of war, deploying in space offensive weapon systems capable of targeting not only objects in space but our entire planet as well."

Objective realities show who it is that genuinely strives for peace and constructive development and who it is that is nurturing adventurist plans of world domination, extending the arms race into space for the sake of achieving their dangerous aims.

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## AIR FORCES COMMUNICATIONS CHIEF STRESSES COMMUNICATIONS EFFICIENCY AND SECURITY

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[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Lt Gen Avn A. Roshchin, Air Forces chief of signal troops and electronic support: "Communications Discipline"]

[Text] Advances in electronics have greatly expanded the combat capabilities of the Air Forces. Vast changes have also taken place in organization of command and control of aircrews and subunits, and particularly in the material foundation of command and control -- the communications system.

Requirements pertaining to transmission of information from ground to fixed-wing and rotary-wing aircraft and back are steadily growing. A certain conflict arises thereby: the quantity of information required for decision-making has increased, while time available for collecting this information has decreased. In these conditions constant pressure exerted by the "time factor" and the endeavor to transmit the necessary volume of data faster are forcing executing personnel to seek ways to shorten time required, unfortunately sometimes to the detriment of existing rules and regulations governing operation of electronic equipment. In other words, communications discipline is violated.

A stepped-up campaign is presently under way in this country to achieve further strengthening of discipline and order and to increase organization and responsibility in every area of work. One such emphasis area in the military is all-out strengthening of communications discipline in units and subunits.

When we speak of communications discipline, we mean first and foremost a specific orderly procedure in the conduct of radio and telephonic communications, both by command and control entity officials and by military personnel operating and servicing equipment, working directly on radio sets, other radio-frequency emitting devices, as well as at telephone exchanges and telegraph stations. This procedure has been developed through many years of experience, with consideration of the fact that the adversary is constantly eavesdropping on and analyzing our communications traffic. And as we know, this can give him advantages in high-intensity modern combat. It is no secret that any violations of communications discipline lead to acquisition by hostile intelligence of data which, in combination with intelligence obtained from other sources, help the

adversary predict the activities of our troops in advance and determine their fighting efficiency. "Communications should be secure, protected against hostile jamming and uninterrupted, regardless of the complexity of the electronic environment," stresses USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo. "Command and control in today's war are impossible without this."

In conditions of extensive employment of military electronic equipment, communications intelligence is becoming an important and reliable means of obtaining intelligence on the adversary. There are many reports about the effective activities of foreign intelligence services during World War II, which stress that deviation from established rules, regulations and procedures of utilization of electronic equipment is an outright gift to hostile intelligence services.

In a certain battlefield sector a flight of Soviet fighters scrambled to intercept enemy aircraft which were attempting to mount an attack on Soviet troop dispositions. Intercepting the group of bombers, which were under fighter escort, the Soviet pilots boldly engaged and achieved victory. The Hitlerite attack was thwarted, and the Germans lost several aircraft. While returning to their field, however, the Soviet pilots forgot about communications discipline: they conducted enthusiastic radio conversation. The group leader gave instructions to his wingmen, the latter replied, and themselves addressed queries to their commander. This was a violation of orders demanding strict radio silence in the fighters' new deployment area. Nor did the command post promptly stop the violation.

The enemy, who had been waiting for an opportunity to DF the hitherto unknown location of the Soviet airfield, exploited this opportunity. That night there was an attempted massive raid on the airfield. And it was only thanks to the vigilance of the command post duty crew and the skill of the combat pilots that this fascist air attack was thwarted.

This incident from the war shows the potential result of unnecessary radio communications and ignoring of radio discipline.

As practical experience indicates, today it is more important than ever strictly to observe requirements pertaining to organization of communications, due to the highly-fluid and dynamic nature of modern air combat. We should like to emphasize that we have amassed certain communications organization experience in handling flight operations and performance of other combat training tasks. For example, there has not been a single instance of gross violation of radio discipline in recent years by the outfit headed by officer V. Saukh. The subunit command authorities and party organization do a great deal of organizational, training-methods and indoctrination work aimed at preventing violations of communications discipline and the requirements of documents pertaining to secure troop command and control. Guideline documents pertaining to training military personnel for alert duty and critique of results of performance of assigned missions each day have been drawn up toward this end. They were discussed at the methods council and approved by the commanding officer.

Preparations for duty shifts begin with selection and distribution of personnel to maintain precise, uninterrupted communications in radio nets and radio links, as well as wire, microwave-relay and tropospheric communications, taking into consideration the individual features and degree of professional skill of each man. Highly-proficient specialists are assigned to the most important links. On the eve of going on duty, practice drills are conducted, the specialists are tested on knowledge of their duties, and they are instructed strictly to observe communications discipline.

Good training facilities have been established in the unit. Specially equipped classrooms provide the capability thoroughly to prepare personnel for going on duty. In addition, documentation and training equipment provide the capability to test the men's knowledge of their job duties and actions during receiving and transmitting tactical control messages, during communication of unexpectedly occurring situation changes and in an emergency situation, as well as in the process of working on performance standards pertaining to routine communications.

A security monitoring station has been set up to monitor observance of discipline in the nets and links. The most proficient specialists are on 24-hour duty at this station; results are analyzed daily, and specific measures are promptly taken to correct deficiencies.

After communications personnel go off alert duty, subunit officers conduct a detailed debriefing and grade each individual and the duty shift as a whole.

Purposeful party-political work is conducted in the unit. Each month lectures are presented to the men, and talks are held on topics dealing with precision troop command and control. Observance of rules and regulations governing communications is regularly discussed at party and Komsomol meetings. Visual agitation display stands have been set up in the subunits and at duty facilities, containing materials on guarding military and state secrets and observance of the requirements of guideline documents. These efforts are producing positive results.

For example, at an exercise held last year in the Baltic, the men of the battalion led by officer V. Pasechnik, in spite of the difficulties of the electronic situation, successfully accomplished their assigned missions. During the entire time of the exercise not one specialist committed a violation of communications discipline. All the men ensured prompt movement of information.

We know that of great importance for increasing stability of troop command and control is prompt, timely and precise siting of command and control facilities, communications centers and links according to a rigorously defined system. Swift resiting of facilities makes it possible to remove men and equipment from hostile attack and ensure continuity of combat operations. In connection with this, in today's dynamic combat, during necessary displacements of command and control facilities with communications centers, personnel require the ability to take down, displace and deploy rapidly, swiftly to establish communications with troops and higher headquarters, and to provide command and control during movement.

Unfortunately, however, certain deficiencies still occur in the operations of communications teams. For example, sometimes radio transmitters are on the air for an unwarranted length of time during establishment of communications, which makes it easy for hostile electronic surveillance to obtain a DF bearing. Military personnel with a distinctive signature in operating the transmitting key are allowed to operate radio communications equipment. This means that they may be followed on the air and their location determined, which does detriment to the combat readiness of crews and subunits.

Today signal and flight operations electronic support units are provided with first-class equipment, which requires of personnel thorough knowledge, a high degree of skill, physical conditioning, and strong moral, combat, and psychological qualities, for it is no secret, for example, that radio communications are the sole means of controlling aircrews located several thousand kilometers from a command post. It is no easy matter to ensure uninterrupted communications.

Airborne communications specialists on board missile-armed aircraft are assigned critically important missions -- to secure and maintain unbroken radio communications with command and control facilities, promptly to report status of mission performance, and promptly to receive and confirm all commands transmitted to the aircraft. In order successfully to accomplish these tasks in any and all weather and tactical situations, communications personnel must be not only high proficiency-rating specialists, professionally and technically knowledgeable, but must also be disciplined individuals. This in large measure determines precision and stability of command and control and prevents the adversary from quickly obtaining a DF bearing on transmitting aircraft, with the consequences which proceed from this.

But such violations of communications discipline as failure promptly to respond to ground station calls, inexact execution of commands from the base station, poor quality of transmission, and poor tuning of airborne radio equipment can lead to failure to accomplish the combat training mission.

...Several aircraft were in the air. The aircraft radio operators were practicing their ability to conduct communications in conditions of active "aggressor" jamming. In one of his reports to his command post, squadron communications officer Capt V. Azarov stated the precise time he would next come on the air. This would seem to be a trivial mistake. The "aggressor" exploited this mistake, however. Command and control of the aircrew was disrupted, and accomplishment of the mission was under threat of failure. Although this is not a common occurrence, nevertheless it taught a serious lesson both to the crew and to the squadron command authorities.

Considerable work aimed at strengthening communications discipline is conducted in the outfits headed by officers L. Shirokiy and A. Shcherbina. They devote much attention to the moral and psychological training of their men. Prior to each duty shift they conduct drills with them on organization of communications in conditions maximally approaching actual combat. An important factor in increasing their activeness is skillfully organized socialist competition on tasks and performance standards. Commanders, party and Komsomol organizations direct the principal efforts of communications personnel in combat competition toward excellent mastery, skilled employment and knowledgeable servicing and

maintenance of radio equipment and other communications gear, increasing proficiency ratings and strengthening discipline in the conduct of official communications.

In these units they rigidly monitor not only the performance of long-range communications specialists but also the tower UHF radio nets. This disciplines the aircrews and makes it possible to ensure stable command and control of airborne crews.

At the same time strengthening of communications discipline is a task not only of units and subunits assigned an aviation support role but also of headquarters staffs, command and control facilities of all categories. A particular danger is presented by unintelligent use of public communications by officials to conduct service-related communications, which sometimes can lead to disclosure of information comprising a military and state secret. Also of considerable importance is strict observance of established rules, regulations, procedures and phraseology of radio communications between aircrews and ground stations.

Any deviations from established rules and regulations governing radio communications and verbosity during radiotelephone communications can be used by the adversary for provocative purposes. The U.S. leaders are capable of any and all adventures and are willing to utilize any and all means in pursuit of their imperial pretensions and selfish interests. This is confirmed by a "crusade" against socialism as a societal system, openly announced by President Reagan, by an unprecedented U.S. buildup of its military potential, by the large-scale U.S. programs to produce nuclear, chemical, and conventional arms, as well as plans to extend an unchecked arms race into space.

All this obliges Air Forces communications personnel to be on guard, to display a high degree of political vigilance, to work persistently to improve their proficiency and to perform combat alert duty in an exemplary manner.

Preventive efforts directed toward strengthening communications discipline can be effective if they are conducted on a daily basis, purposefully, not only with command personnel but with all personnel. The experience of the command authorities and party organization of the unit commanded by officer N. Minakov merits strong approval and practical adoption.

Recently the men of this outfit had to provide communications in difficult conditions. The complexity of the tactical and meteorological situation, an abundance of incoming information, and a high level of interference demanded extreme exertion of moral and physical energy of the specialists. But not one of them violated radio communications rules and procedures. All information was received and transmitted quickly and without distortion. Work performance was distinguished by smoothness and a high degree of organization and discipline.

This success is logical. Training of personnel is intelligently organized in the crews, and active efforts are made to instill in them the requisite moral-political and fighting qualities and to instill in each and every specialist a strong feeling of personal responsibility and follow-through. Utilizing

the force of party and Komsomol influence, the subunit commanders and political workers are making every effort to develop in their men such important qualities as honesty, truthfulness, and rigorous observance of the requirements of the military oath, instructions and regulations. They have established a fine training facility, which gives them the capability comprehensively to work on various problems pertaining to providing communications in conditions maximally approximating actual combat. They regularly hold training classes and drills to prepare personnel for standing duty, and the achievements of and mistakes made by the specialists are thoroughly analyzed and synthesized.

Communists and Komsomol activists accomplish effective work with military personnel. Specific-topic evening activities are frequently held in the subunits at their initiative, lectures and talks are presented, during which the insidious methods of conduct of communications intelligence and electronic surveillance by the imperialist nations are revealed, and the need for the greatest alertness, discipline, and a high degree of combat readiness on the part of crews, subunits, and units is emphasized.

Each and every man, whether he performs telegraph or radio communications duty or handles wire communications, should always bear in mind the fact that he is occupying a critically important post, where maintenance of discipline, observance of regulations and organization are extremely important. Nobody should ever forget this fact under any circumstances.

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## PILOT RELATES REASONS FOR MISSED APPROACH

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[Article, published under the heading "This Could Have Been Avoided," by Maj V. Usol'tsev: "...Could Be Even Better"]

[Text] I was talking with Lt Col V. Astrakhantsev, an experienced pilot who has logged thousands of hours. We were discussing the flying technique of a pilot acquaintance.

"He does a good job," said Viktor Aleksandrovich. "But he could do even better." And he explained: "He has not always self-critically evaluated his successes. This has impeded improvement of his skill. Fortunately this comrade has realized this fact in time.... Unfortunately, this is not an isolated example," Astrakhantsev continued. "If a person begins to exaggerate his own abilities, he ceases efforts to improve. And such a good quality as self-confidence, which a pilot needs, becomes excessive self-assurance, and sometimes even conceit. This can result in undesirable consequences, including the creation of conditions for an air mishap."

And he related the story of Sr Lt L. Trunov, who had served with him in an Air Forces training regiment. They used to say about this pilot that he grasped everything immediately. He was succeeding well in flight operations, in working with the pilot cadets, and in study of theory. This ease in achieving stated goals gradually engendered in this capable officer excessive confidence in his own ability. He began paying less attention to preparation for flight operations and neglected practice.

Gradually this pilot began flaring high on his landing. Most frequently he would land his fighter hard. His superiors and comrades brought this to his attention, but he practically ignored their comments and advice. "Everyone has his own flying characteristics," he would reply to his fellow pilots.

They took the pilot up on check rides. He performed well. But as soon as he went back to solo flying, the mistake would be repeated. It was obvious that in the two-seater Trunov was more composed and tried harder, while when flying his combat aircraft he adhered to his own "flying signature." In addition, he considered his error to be trivial, having no effect on quality and safety of flight operations.

But once Trunov damaged his aircraft on landing. The pilot was given deserved punishment. Only after this was there a radical change in his attitude toward his conduct, performance of duty, and flight operations. His false bravado disappeared. He once again began working conscientiously, diligently, thoroughly preparing for each training sortie. Later this officer successfully passed the examination for first class.

The fate of officer cadet Yu. Antonov, whom Astrakhantsev was instructing, turned out differently. Everything also came easily to him: he received excellent grades, was a volunteer activist and a good athlete. He had also begun mastering dual training on a jet fighter without any difficulties, and he soloed successfully. He was praised and cited as an example.

Antonov was tripped up by excessive pridefulness. He made a number of mistakes in working on more complex maneuvers. Antonov should have applied himself to theory, critically evaluating his achieved performance level, and corrected deficiencies. Unfortunately the young pilot proceeded differently. He inalterably failed to take his instructor's comments with good grace and worked with reluctance on correcting his mistakes, believing that only dummies worked hard. Astrakhantsev, the flight leader, and the fellow members of his flying group endeavored to convince Antonov that a person cannot become a genuine combat pilot without painstaking labor. But things did not change for the better; the pilot cadet refused his friends' help.

In the meantime the number of mistakes increased, and gradually each mistake was becoming worse. Eventually Antonov was washed out of the program for failure to progress in his flying. This was the first such instance in officer Astrakhantsev's experience as an instructor.

Not only young pilots lose their ability to be self-critical. Sometimes experienced combat pilots also suffer from this "disease." Astrakhantsev has committed firmly to memory parting words by his instructor: "Have the ability to see shortcomings, to admit them honestly, and pay close heed to the comments and advice of your elders. This will enable you to advance professionally more rapidly." Viktor Aleksandrovich was guided by these words of wisdom both at the beginning of his officer's career and in later years. And if the temptation arose to justify incorrect actions with any objective factors, he would immediately vigorously reject such a temptation.

...Transport aircraft piloted by military pilots 1st class aircraft commander V. Mygas and flight commander Maj V. Astrakhantsev (he had been transferred from fighters) were returning home after successfully completing a mission. The time separation between aircraft was 15 minutes. Upon approaching the field, the pilots requested field conditions.

"Ceiling 150 meters, visibility 1,200-1,300 meters," the tower controller replied, and cautioned: "Expedite approach, weather deteriorating."

Captain Mygas was the first one down. Major Astrakhantsev's aircraft broke out of the clouds to the right of the runway extended. He was too close to correct his approach path. The pilot decided to go around. Executing a missed approach, he flew a procedure turn and brought the aircraft precisely onto the localizer and glideslope.

"Visibility now 1,000 meters, ceiling 120," the controller informed him.

"We will break out over the middle marker," Astrakhantsev said to himself. He radioed to the tower: "Roger. On final."

He was still in clouds as he approached the middle marker. The ground appeared for a second in a break in the clouds, but then disappeared. Finally, when the radio altimeter was approaching 100 meters, the crew could see the runway lights. Once again he had drifted off the localizer.

"31, execute missed approach," ordered the tower.

"Another go-around," Viktor Aleksandrovich uttered unhappily, advancing his throttles and climbing.

The third approach was successful.

Many of the people in his outfit thought at the time that the pilot would make excuses. But at the debriefing party member Astrakhantsev honestly admitted that he had made mistakes on the two approaches.

With his characteristic straightforwardness, the officer proceeded to analyze them, illustrating his presentation with drawings on the board. The reason for the first missed approach was the fact that he had paid excessive attention to the altimeters. On the second approach he had gotten nervous, looking for visual contact. On both approaches Astrakhantsev had not paid enough attention to keeping the localizer needle centered, as a consequence of which the strong crosswind had drifted the aircraft off the runway extended. And this had happened rather quickly: between outer and middle marker.

This incident became an object lesson not only for Astrakhantsev but also for his comrades. They extracted a great deal of benefit from it both for their professional and moral improvement.

"Truth is always better than deception, no matter how bitter a pill it may be," Viktor Aleksandrovich concluded his story about that memorable flight.

In command of an aviation subunit, officer Astrakhantsev taught his men not to shut their eyes to mistakes and realistically to evaluate their personal successes. In the unit in which he had previously served, the best pilots include pupils of his -- 1st-class combat pilots Maj V. Polonskiy, Capt A. Firsenev and others, who do not rest on their laurels and work constantly to correct the slightest defects in their flying technique and gaps in their knowledge.

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## CONCERN OVER INADEQUATE AIRCREW EMERGENCY PARACHUTE TRAINING VOICED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) p 27

[Article, published under the heading "The Reader Reflects," by Master of Sport USSR Maj Ch. Adzhiev: "Not Only Sports"]

[Text] The question of purposeful parachute training in Air Forces units and schools has been raised in this journal on several occasions. Nobody denies the importance of this problem, but nevertheless desirable results have not yet been achieved everywhere. Pilots and navigators -- graduates of military aviation schools -- with a minimum number of jumps continue coming to the line units.

A new document on organization of jump training recently went into effect. It specifies that officer cadets at flying schools and flight personnel shall make a large number of jumps. If an officer cadet makes some of these jumps at school, he must make the remainder during his first three years of line unit duty. Some line units, however, other than military air transport and helicopter units, do not always have aircraft from which personnel can make jumps. Of course commanding officers are taking the necessary steps to correct this deficiency. But sometimes their capabilities and energies are insufficient.

There is also another, no less important matter. In military air transport units many aircrew members come on board "right from the ground," as they say. What training should be provided for flight crews? One or two jumps, and leave it at that? But this is too few. One cannot be confident that a person will immediately grasp and sense how to control his canopy, his body, or learn to configure himself for a correct landing on the basis of the impact surface.

Parachute jumping is a complex training and indoctrination process. It requires serious and systematic work on the part of commanders, political workers, and parachute jump service specialists. Parachute jumping develops in personnel an emotional stability, confidence in the reliability of one's rescue gear, and teaches people independently to make expedient decisions, to act quickly and precisely under conditions of stress factors and when there is no time to spare. This kind of personnel training should not be given up.

Many years of experience as chief of the parachute jump service convinced me that emergency parachute training should be separated from preflight preparation

of emergency rescue equipment. I believe that the parachute training officer should work primarily with organization and conduct of practice parachute jumps, ground and air ejection, and aircraft emergency abandonment drill sessions. Emergency parachute and airborne training officers of military transport aviation units have enough on their hands with loading aircraft and operating parachute jump flight operations. In my opinion a separate maintenance team should prepare emergency gear for flight operations. The fact is that the emergency kit includes not only parachutes but also automatic chute opening devices, oxygen breathing gear, portable emergency supplies and radios, individual and group flotation devices, plus other gear. Concern with saving lives is obvious, but it is necessary adequately to improve the quality of preparation of all gear.

Precisely this question, however, currently remains the most ticklish matter. Parachute riggers, for example, learn rigging in the process of regular duty in their unit. In addition, servicing and maintenance procedures on emergency gear are performed at different times, which unquestionably affects readiness. Although this cannot be helped, it seems to me that nevertheless we should not simply accept it.

All servicing and maintenance procedures on emergency gear should be performed when the aircraft is in the technical maintenance unit for preventive maintenance. The combat readiness of the aircraft and crew members can only gain as a result of combined performance of servicing and maintenance procedures.

The matter of selecting parachute jump service officers also requires particular attention. It sometimes happens that officers are appointed to this position who do not always possess specialized knowledge or the requisite methods skills. Quite logically such an officer will be unable to set up parachute jump service quickly and knowledgeably or effectively train personnel. In addition, the category of junior officer scarcely helps strengthen his image and authority. Specialists of a higher echelon rarely can work with matters of service in the units, since sport parachute activities require considerable time.

As observations indicate, various aircraft are sometimes assembled at sport parachute team training sessions, aircraft which are not always fully utilized, while in the line units flight personnel fail to make the required number of jumps due to lack of available aircraft. I believe that another factor in this undesirable situation is that frequently commanders appraise the performance of parachute jump service officers primarily according to their sports achievements, and very rarely does the state of personnel parachute training comprise a component of totaling up performance results.

There is no question about the fact that our aircraft are extremely reliable. In the air, however, especially in a combat environment, anything can happen, and a crew may be faced with the necessity of parachuting to safety. The laws of the skies are the same for all, and he who is thoroughly familiar with his emergency gear and is able to utilize it correctly will do a good job of handling a difficult situation.

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## PROCEDURES OUTLINED FOR ADMISSION TO SERVICE SCHOOLS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 30-31

[Article: "To Those Who Wish to Dedicate Themselves to Aviation"]

[Text] The Communist Party and Soviet Government are constantly concerned about strengthening our country's defense might, the combat potential of the Soviet Armed Forces, and improving training of officer cadres. Carrying out the demands of the party, the USSR minister of defense, and the commander in chief of the Air Forces, the personnel of military aviation schools are working persistently to improve the effectiveness of the training and indoctrination process and the quality of professional training of defenders of our homeland's airspace.

Many aviation schools have been awarded the Orders of Lenin, the Red Banner, and the Red Star for successes achieved in training military cadres. A prominent place among these schools is occupied by the Kacha and Borisoglebsk higher military aviation schools for pilots -- flying schools with a venerable history.

Each year another group of graduates of aviation schools joins the officer corps of the USSR Armed Forces. Having obtained basic knowledge of theory and skills in operating and maintaining aircraft, the young officers successfully master new types of fixed-wing and rotary-wing aircraft in short order and confidently take their place among our combat aviators. The highly trained, politically mature pilots, navigators, engineers, and technicians are totally dedicated to their homeland and the party and are faithful to the heroic traditions of the generations which have preceded them.

Many young aviators remain at their schools as instructors and devote their lives to training and indoctrinating future combat pilots. They teach their students to fly fixed-wing and rotary-wing aircraft, develop professional skills in them, and instill a love of the service. Today's pilot-instructor, who possesses thorough knowledge of theory of Marxism-Leninism, is an active bearer of Communist Party and Soviet Government policy among the young aviators.

For the officer cadet an instructor is a model of officer honor and dignity, citizen and patriot of the socialist homeland, a standard to follow in flying skill, combat employment and operation of aircraft, an example of follow-through

and discipline. Recalling his years of study at aviation school, USSR Pilot-Cosmonaut G. Titov speaks of his teacher with warmth and respect: "Capt Stanislav Ivanovich Korotkov was my MiG instructor. He was considered one of the school's finest methods experts, never judged people hastily, and studied them with kindly feelings and tactfulness. His thought process was deep, he had sensitivity, and he had the ability to treat us officer cadets, who lacked life experience, as equals. We loved him and had absolute trust in him."

Among instructors who have worked for many years at Air Forces schools and have produced dozens of excellent combat pilots, high command positions and the honorary title Honored Military Pilot USSR are held by Yu. Avdeyev, V. Aleksintsev, N. Vertel', V. Garanin, V. Grishin, A. Didyk, I. Zheleznyak, N. Kryukov, V. Maleyev, Yu. Marchenko, V. Tribshtok, and V. Chelyshev. The title USSR Master of Sport is held by A. Butayev, V. Gavrilenko, A. Gorbatikov, V. Grushin, Kh. Ibragimov, V. Makarov, A. Simonov, V. Strekalovskiy, V. Tsykunov, Yu. Chernyayev, and many others.

A pilot's labor is highly specific. Flying demands solid specialized training and physical stamina, moral-political and psychological fortitude. Persistence in working to reach the stated objective, self-mastery and tenacity, ingenuity, and a strong feeling of responsibility for accomplishing every flight assignment -- these qualities, which are essential in flying, are developed in officer cadets at school during the entire period of training and indoctrination.

In the line units, as they improve their professional skills, pilots and navigators are awarded the proficiency ratings "Military Pilot (Navigator) 3rd, 2nd, and 1st Class," "Military Pilot-Expert Marksman," "Military Navigator-Expert Marksman," and the honorary titles "Honored Military Pilot USSR" and "Honored Military Navigator USSR." Technical personnel are awarded proficiency ratings of 3rd, 2nd, and 1st class, as well as the Air Forces master rating.

Aviators are members of a heroic profession. The party and government greatly appreciate their labor and are constantly concerned with their combat training, daily life and comfort.

\* \* \*

Young man! If you have decided to devote your life to aviation and have written on the application form: "I want to become a military pilot (navigator, engineer, technician)," these words express your career program for many years into the future. Air Forces higher educational institutions will help turn into reality your dream and firm resolve to learn a military profession.

Military aviation schools accept male civilians and compulsory-service enlisted personnel and noncommissioned officers of all arms of service, regardless of military occupational specialty and length of military service, with a completed secondary education, as well as graduates of Suvorov and Nakhimov military schools, who are medically fit for enrollment and who have successfully passed the entrance examinations. The age of enrolling students -- from 17 to 21 -- is the age in the year of initial enrollment.

Extended-service personnel are accepted to enrollment after two years of extended service, at not more than 23 years of age.

Warrant officers may enroll in higher military aviation schools after two years of service in warrant officer or officer slots, at not more than 23 years of age.

In their application military personnel shall indicate their military rank, last name, first name, patronymic, position currently held, year and month of birth, level of education and name of the military educational institution in which they desire to enroll. The applicant shall attach to the letter of application a brief autobiography, employer and party (Komsomol) character references, notarized copies of the secondary-school diploma and birth certificate, three certified photographs (bareheaded, measuring 4.5 x 6 cm).

In their letter of application civilian youths shall state their last name, first name, patronymic, year and month of birth, home address, as well as the name of the military educational institution in which they wish to enroll. They shall attach to their letter of application a brief autobiography, a character reference from their employer or school, a party (Komsomol) character reference, a copy of their secondary-school certificate (applicants currently enrolled in secondary school shall submit a school statement of current progress), birth certificate, and three certified photographs (bareheaded, measuring 4.5 x 6 cm).

Applicants shall submit their identity card, military service card or draft registration slip, original secondary-school certificate and birth certificate to the admissions board upon arrival at the military educational institution.

Candidates for admission shall arrive at the school at the time specified for taking entrance examinations, upon notification by military commissariats and unit commanders, which shall issue them gratis travel vouchers. Upon arrival at the school, civilian applicants will be provided free board and dormitory lodging.

Competitive entrance examinations for Air Forces higher flight and engineering schools cover the extent of the secondary-school curriculum in mathematics (written and oral), physics (oral), Russian language and literature (written). Entrance examinations for the Kurgan Higher Military-Political Aviation School cover history of the USSR (oral), Russian language and literature (written), mathematics (oral), and geography (oral).

Entrance examinations for secondary aviation schools cover two subjects: Russian language and literature (written) and mathematics (oral). Civilian applicants shall in addition be tested in physical training, conforming to performance requirements for the Prepared for Labor and Defense of the USSR program.

Entrance examinations are held from 15 July to 5 August.

Applicants who were awarded a gold (silver) medal upon completing secondary school or who graduated with honors from a secondary specialized school are required to take only one examination, in mathematics (written or oral), when

applying to higher military aviation schools. An applicant who receives a mark of "excellent" on this examination shall be exempted from further examinations, and if he receives a mark of 4 or 3 he shall take examinations in the other specified entrance-examination subjects. Secondary-school graduates who have been awarded a "For Particular Success in the Study of Individual Subjects" certificate shall be exempted from examination in these subjects for enrollment to secondary military aviation schools.

The following shall be admitted to military educational institutions without entrance examinations:

Heroes of the Soviet Union and Heroes of Socialist Labor;

graduates of Suvorov military schools -- to higher command (with a four-year curriculum) and to higher military-political schools;

persons who have graduated from secondary school with a gold (silver) medal or from secondary specialized school with honors, as well as graduates of Suvorov military and Nakhimov naval schools -- to secondary military schools.

In addition, persons who have successfully (receiving grades of "good" and "excellent") completed the first and subsequent years of study at civilian higher educational institutions in areas of specialization corresponding to the specialization of the school in question, and who meet the other requirements for admission to military aviation schools, may be admitted without entrance examinations to the first year of study at higher and secondary military aviation schools following a personal interview.

Compulsory-service and extended-service military personnel who are excellent-rated in combat and political training (for a period of not less than 1 year and listed in unit orders) shall be accepted to aviation schools without competitive selection under the condition of favorable performance on the entrance examinations. Extended-service personnel shall also be accepted to secondary military schools without competitive placement.

Applicants sent for study on the basis of all-union Komsomol authorizations issued by rayon and city Komsomol committees, unit political sections, vanguard workers and kolkhoz farmers shall be accepted on a preferential basis in competition among secondary-school graduate civilian applicants who have received the same combined score on the entrance examinations. Graduates of youth military-patriotic schools attached to military schools, civilian applicants awarded certificates of merit following completion of secondary school, as well as submitting documents attesting to active participation in school and other study groups, Olympiads, competitions and reviews conducted by higher educational institutions and organizations shall also be preferentially accepted to aviation schools over persons who have received the same overall score on the entrance examinations.

Competitive selection of candidates from among military and civilian applicants shall be performed separately, in conformity with the total number of points earned on the entrance examinations, and the mathematical grade average for all subjects as indicated on the applicant's secondary-school certificate.

The term of study at higher flying schools, military-political schools, at the Kharkov Higher Military Aviation Communications School imeni Lenin Komsomol of the Ukraine (except for the air traffic control radar specialization area) and the Voronezh Higher Military Aviation Engineering School (except for the meteorology specialization area) is four years; the term of study is five years at higher engineering schools; the term of study is three years at secondary aviation-technical schools.

During the course of study enrolled personnel receive annually two weeks vacation and one month of leave with free travel.

Cadets completing the curriculum are awarded the rank of lieutenant, engineer-lieutenant, or lieutenant technical service, and are given a standard national diploma, with designation of the corresponding level of qualification.

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## TEST PILOT DZYUBA'S CAREER REVIEWED

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[Article, published under the heading "Stories About Test Pilots," by Lt Col (Ret) P. Gus'kov: "Wings Grow Strong in Flight"]

[Text] When Ivan Mikhaylovich Dzyuba was awarded at a meeting of veterans at the garrison Officers' Club a memorial medal in honor of the 40th anniversary of the first jet-powered flight, he recalled that last winter before the war and the airfield at which he had served after completing service school and at which he had subsequently spent his entire postwar flying career. Fate had brought him together there with an amazing individual, a person totally devoted to aviation, test pilot Grigoriy Yakovlevich Bakhchivandzhi, who later, on 15 May 1942, made the first flight in a jet-propelled aircraft. Under his direction Dzyuba took part in military field testing of experimental models of the new Yak-1 fighter. Soon he had occasion to test the combat capabilities of these aircraft in aerial combat with the fascists.

...It was a disquieting night in July 1941. Pilots were on scramble-ready alert in the cockpits of shiny new fighters just received from the factory. The wait dragged slowly on. Searchlight beams nervously probed the sky over Moscow; antiaircraft shellbursts flashed somewhere out against the horizon. The blinding illumination of a signal flare suddenly cut the darkness of the night -- the signal to scramble.

The aircraft were airborne. Dzyuba peered down at the darkened city. Not a single light was in evidence. It had been just recently that he had also seen the capital with searchlight beams playing, but a festive, May-Day Moscow, with a human stream of celebrants coursing through the brightly-lit evening streets. How everything had changed!

A silver dot flashed in a searchlight beam. A bomber! The young pilot's heart-beat quickened. He firewalled the throttle and headed for the target, closing rapidly. Searchlights held the enemy airplane fast in their bright tentacles. He was now quite close. Putting the cross hairs onto the aircraft's silhouette, Dzyuba pushed the trigger button. Pierced by a stream of machinegun tracer rounds, the Junkers first dipped into a bank, then burst into flames and went down near Naro-Fominsk.

During those grave days in August and September 1941, when fascist divisions were driving on Leningrad, the 12th Fighter Regiment, with which Ivan was serving, was redeployed from the Moscow area to the Valday Hills. Dzyuba was made a squadron commander and given an early promotion to the rank of captain. Flying day and night, as many as 5-6 sorties daily, the squadron's pilots engaged the superior enemy forces in savage combat. They displayed amazing staunchness and will to win in every clash.

Once a group of 9 fighters led by the squadron commander encountered 20 fascist aircraft near Demyansk. Dzyuba engaged the fighter escort with two other aircraft, while the remaining pilots attacked the bombers. Five enemy aircraft were downed in the unequal battle. No Soviet aircraft were lost. Dzyuba, skillfully maneuvering, shot down 2 Messerschmitts.

On another occasion, leading a 2-aircraft flight, Lieutenant Makarov, wingman, the squadron commander engaged 5 enemy bombers near Staraya Russa. Coming out of the sun, Dzyuba first attacked the leader and downed him. The other bombers simply released their bombs and fled. The Hitlerite pilot, who had parachuted to the ground, was captured. He stated during an interrogation that there was a large concentration of aircraft at the Dno airfield. Ivan Dzyuba, accompanied by another aircraft flown by the commander of a neighboring regiment squadron, took off on a reconnaissance sortie to verify the prisoner's story. The information proved correct. That night Soviet bombers battered the fascist airfield.

By the end of 1941 the squadron commanded by Captain Dzyuba had flown 500 combat sorties, had killed large numbers of enemy personnel and destroyed considerable enemy combat equipment, and had shot down 16 enemy aircraft. The squadron had sustained no losses. These figures were not a result of pure luck. The squadron commander had thoroughly studied the enemy's tactics and had always come up with effective countertactics at the necessary moment. The following is an incident from his combat biography.

One day in May 1942, in the Crimea, the pilots of the 89th Guards Fighter Regiment were providing air cover to Soviet troops which were holding back an enemy force which was advancing on Kerch. They had taken to the air three times and driven off enemy aircraft. But the latter continued to reappear. And when 16 Messerschmitts proceeded to hover over the city for a fourth time, they were engaged by 5 fighters led by the regiment's deputy commander, Major Dzyuba. The Soviet pilots forced the fascists to accept battle involving altitude maneuver, for which they were unprepared. Losing 2 aircraft and sensing that they would be unable to withstand the attacks being mounted by the Soviet pilots, the Hitlerites endeavored to disengage as quickly as possible. The commander of air forces of the Black Sea Fleet subsequently cited this tactical device as an example to all personnel.

In August 1942, soon after returning from the Kremlin, where Mikhail Ivanovich Kalinin conferred upon him the Order of Lenin and the Hero of the Soviet Union Gold Star for heroism and courage displayed in combat against the German-fascist invaders, Guards Major Dzyuba reported for duty to the Stalingrad Front. The situation was grave. The enemy was stubbornly pushing toward Stalingrad.

Continuous savage fighting was in progress on the ground and in the air. By that time there were only 16 battleworthy aircraft remaining in the unit. Prior to taking off on a combat sortie, the pilots were being mission-briefed by the army commander.

"We must engage the enemy over the city to the last drop of fuel," he ordered in a flinty voice. "We must show the people of Stalingrad that we still have intrepid pilots!"

"Division commander Lieutenant Colonel Konovalov was leading a group into combat," recalled Ivan Mikhaylovich. "I was his deputy. The group included pilots Vladimir Lavrinenkov and Amet-Khan Sultan, who subsequently were twice awarded the title Hero of the Soviet Union. We had scarcely climbed out when we encountered a large group of bombers. Within minutes 3 Junkers plummeted into the streets of the demolished city. I shot one of them down. We fought desperately. We were down to about 10-15 minutes of fuel, when the sky again darkened with fascist aircraft. Our group once again cut into the Hitlerite formation, and 4 more of their aircraft burst into flames on the banks of the Volga.

"Suddenly a Yak bearing tail number 24 flashed past my aircraft. Where had he come from? We did not have such a number in the division. And it seemed rather strange: we were engaged in combat with fascist aircraft, and yet he was flying with total unconcern. I finally guessed the truth when the strange aircraft, wagging his wings in an unaccustomed manner, proceeded to head westward: he was a fascist! I remembered the intelligence chief's warning that a Hitlerite ace had appeared in the skies over Leningrad. Flying a Soviet aircraft, during combat he would attempt to draw off inexperienced pilots. I keyed my mike and ordered: 'Tail number 24, get back into the fighting!' In reply I heard his call sign and the order: 'Follow me!' I swung my aircraft around to make the intercept. But at that moment I noticed that a Messerschmitt, which was pursuing one of our fighters, was about to catch up. Executing several felicitous maneuvers, I brought my aircraft into attack position and destroyed the fascist. 24 had gotten away. But he did not remain long in the sky over Stalingrad. He was soon shot down.

When the fighting at Stalingrad came to an end, Ivan Dzyuba was reassigned to the 1st Guards Fighter Regiment, to the Volkhov Front. Once again he was flying in combat, this time taking part in breaking through the blockade of Leningrad in the Sinyavinskiye Hills area. Many aerial engagements were fought during more than two and a half years of war. Possessing an excellent mastery of flying technique and a good knowledge of tactics, Dzyuba always emerged victorious. It is characteristic that in these engagements his aircraft took a total of only 12 hits, and the enemy paid for each of these hits with an aircraft.

The war was still in progress and victory was still distant when Dzyuba, a pilot-inspector for flying technique with the 2nd Fighter Corps, was reassigned to a test pilot job. It was necessary to refine the design and construction of qualitatively new combat aircraft, which were so needed at the front. And so he once again found himself at the airfield at which on the eve of the war he

had been learning the rudiments of aircraft test flying with the assistance of Captain Bakhchivandzhi. Almost nothing had changed at the field since that time. Vladimir Kokkinaki and other intrepid pilots who had brought fame to Soviet aviation in the prewar years had flown out of this field. Dzyuba was aware that it was a great honor for him to be assigned to such a famous airfield, an honor which brought with it a great deal of obligation.

He soon saw that it was no easier to test aircraft than to fly them in combat. It was the same daily difficult and dangerous combat, not with a crafty and clever adversary whom he had learned to defeat, but with surprises awaiting him on every test flight, for an untested aircraft is an unknown "thing in and of itself," as it were, and there was no way of knowing how it would behave in the air, especially in maximum operating modes. Dzyuba plunged into test flying and proceeded literally to sop up each and every drop of experience and know-how.

The war came to an end. Piston-engine aircraft were replaced by jet-propelled models. Dzyuba mastered jet aircraft thanks to his inexhaustible diligence and persistence. Together with his mentors P. Stefanovskiy, A. Kubyshkin, and other test pilots, he took part in the first air display of Soviet jet-propelled aircraft. He was awarded a second Order of the Red Banner -- for mastering the operation of new equipment. But Ivan Mikhaylovich knew that in order to become a genuine test pilot it was necessary to learn to feel an aircraft with one's heart and understand it with one's mind, that is, one must be able not only to spot a defect in a prompt and timely manner but also to suggest to the designer how to correct it so that the aircraft will fly properly. And Dzyuba made correct diagnoses, telling the designers how aircraft should be "healed." He considered this to be the main significance of the profession of test pilot.

Once while testing ejection devices on an aircraft, the cockpit canopy tore loose and struck the pilot a hard blow on the head. He lost consciousness for a moment.

"When I came to I could not figure out what had happened," recalled Ivan Mikhaylovich. "Blood was streaming down my face. The aircraft was in a dive. It was time to eject, but then we would not be able to determine the cause of the problem. No, I could not allow that!"

Focusing his determination and fighting the pain, the pilot brought the aircraft back to straight and level, after which he made a normal landing. After studying the problem, the designer altered the canopy jettison system.

During another test flight the engine suddenly quit on final approach to a landing. The aircraft was descending toward forest, with no possible landing site around other than the airfield. It seemed impossible to save the aircraft. But if he ejected, the cause of the engine failure would remain undetermined. Skillfully utilizing the aircraft's high-lift devices and aerodynamic properties, the pilot was able to extend his glide beyond the forest and crash-land within the airfield perimeter, short of the runway. Dzyuba sustained a serious head injury during the landing and spent quite some time in the hospital. A serious flaw in the jet engine's fuel system was subsequently corrected.

During certification testing of an experimental two-seat jet fighter-interceptor, during a landing approach, as the flaps were being lowered, the landing flap synchronous-extension control rod broke at a height of 300 meters. The flap extended only on one side. The aircraft almost flipped over onto its back. Dzyuba instantly raised the flap, brought the wings level, and successfully landed the aircraft. The flaw which had caused the breakage was pinpointed.

While testing the ejection system on a jet-propelled UTI-MiG-15 test aircraft, the telescopic tube of the firing mechanism ruptured at the moment the parachutist was being ejected from the second cockpit. The pilot suffered a concussion from the explosive shock wave. Regaining consciousness, Ivan Mikhaylovich, mustering all his strength and faculties, brought the aircraft back to the field and landed it. A serious defect was discovered in the ejection system firing mechanism. This made it possible in the future to save the lives of many fighter pilots who could have found themselves in a serious emergency situation in the air.

Such unforeseen circumstances were a fairly frequent occurrence for the test pilot. And each such instant demanded of him not only a high degree of flying skill but also great exertion of all physical and mental resources. It was only thanks to his tenacity and courage, knowledge and experience that Dzyuba, just as during the war, risking his life, was able to save expensive experimental models of aircraft and determine flaws and defects revealed during testing.

In 1961 Gds Col Ivan Mikhaylovich Dzyuba was awarded the honorary title "Honored Test Pilot USSR" for innovative work in testing and investigating new aircraft and boldness and courage displayed thereby. That same year he was named unit flying service chief. Possessing outstanding organizer abilities, he led the team of test pilots for more than 10 years. Dzyuba has made a worthy contribution toward improving Soviet aircraft. He has trained and broken in many test pilots, the fruitful flight testing activities of whom have been duly commended by the Soviet State. The command authorities greatly appreciated Colonel Dzyuba's flying skills and on numerous occasions sent him to line units on temporary duty assignment to assist flight personnel transition over to jet aircraft. He ushered many brother pilots into their careers, and they still today remember their mentor with gratitude.

But Dzyuba did not only "teach airplanes to fly" and train test pilots. He also taught future cosmonauts. Hero of the Soviet Union Col Gen Avn N. Kamanin, the cosmonauts' first mentor, recalled Dzyuba with great warmth and affection. "He helped many become competent experts. The future cosmonauts got to know and love him," he wrote in the book "Starty v nebo" [Sky Journeys]. "Dzyuba would frequently tell them: 'I envy you lads! If I were 20 years younger, I too would go into space!'"

In his 35 years of flying, Ivan Mikhaylovich Dzyuba never experienced defeat on the ground or in the air and, as he himself said, "I have never sheared a single cotter pin through my own fault." During these years he flew more than 70 flight tests on aircraft and special equipment, including five certification tests on experimental aircraft. He flew 170 different aircraft types and modifications, and he logged approximately 2,500 hours. He was assigned the

most difficult and critically important missions pertaining to flight-testing experimental fighter aircraft.

Col Ivan Mikhaylovich Dzyuba is now retired. But this veteran is continuing working, in air traffic control in an Air Forces unit. As in the past, his work is connected with the skies, in which he received his baptism of fire and learned the meaning and joy of a test pilot's labor. Party member Dzyuba is deeply involved in military-patriotic work and is teaching the younger generation to love the homeland and to be prepared to defend it. He has a great deal to share with young military personnel and young students. And each such get-together is a lesson in courage and patriotism for them.

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## SHORT-RANGE CLOUD CEILING FORECASTING EVALUATED

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[Article, published under the heading "Constant Attention to Flight Safety," by Candidate of Physical-Mathematical Sciences Engr-Col V. Remenson and Candidate of Geographic Sciences Engr-Lt Col D. Finogeyev: "Low Ceilings"]

[Text] Practical experience in weather forecasting for flight operations in instrument weather shows that forecasting low ceilings is a rather difficult task. Accomplishment of this task requires of the forecaster solid preparation in theory and the ability to apply computation methods of forecasting. The synoptic method, which is widely used for this purpose, is insufficiently reliable, and therefore it sometimes becomes one of the causes of weather-related air mishap-threatening situations.

The fact is that the synoptic method is grounded on the principle of taking into account chiefly advective (horizontal movement of air masses) changes in weather components. During intramass processes, however, when there is little advection, the values of weather components are more affected by turbulence, transformation, and other nonadvective factors. The synoptic method does not ensure safety of flight operations in these conditions.

In a certain unit, for example, they flew a trial flight one afternoon, flying the navaids in determining weather minimums. According to the forecast prepared by Capt V. Mokichev, using the synoptic method, they were expecting overcast conditions with ceiling at 150-200 meters. On its landing approach the aircraft descended to 150 meters, but failed to break out of the clouds. As a result the flight operations officer was forced to send the aircraft to its alternate field.

During analysis of this incident the supposition was put forth that, in addition to an erroneous forecast, there had been an error of omission -- they had failed to send up a weather reconnaissance aircraft. Was this supposition entirely correct, however? Let us consider the matter.

By sending up a weather reconnaissance aircraft, one can obtain information on the existence of an area with low ceilings and data on the speed and direction of movement of that mass. In other words, one can determine advective changes

in cloud bases in the vicinity of the airfield. But if the height of cloud bases changes due to nonadvection factors, sending up a weather reconnaissance aircraft will not help. In the case under discussion advection was insignificant, and consequently changes in cloud ceiling were characterized by nonadvection factors.

Here is another example. The field was operating IFR. According to the forecast prepared by duty forecaster Capt V. Dubovitskiy, they were expecting 300-500 meter ceilings, occasional rain with ceilings dropping to 200 meters and visibility reduced to 2 kilometers. A weather reconnaissance aircraft confirmed that conditions were at or above minimums in the vicinity of the field. Soon, however, the ceiling began to drop, and flight operations officer Lt Col N. Ostapenko closed the field down. Within half an hour the ceiling had dropped to 150 meters.

We should note at this point that in order to spot low-cloud conditions, aerial weather reconnaissance should be flown below the cloud cover. But frequently this cannot be done due to dangerous closeness of terrain.

As is indicated by experience in flight operations weather forecasting support activities, in most cases time of advance weather forecasting to make a decision to allow landings does not exceed an hour. Such an advance forecast time is specified in the requirements of the World Meteorological Organization for international aviation weather services. According to these regulations, an error in forecasting ceilings for landing operations with a probability of 90 percent should not exceed  $\pm 30$  meters with ceilings below 120 meters and  $\pm 30$  percent for heights above 120 meters.

The difficulty of forecasting the height of low ceilings with the requisite accuracy is due to the variability of ceilings on a time axis. Studies indicate, for example, that the absolute variability of height of low ceilings may amount to as much as 60 meters within the span of 1 hour.

However, if one examines variability around a mean value over this same period, it proves to be significantly less. With a mean ceiling height of less than 100 meters, for example, absolute deviations do not exceed 20 meters, 30 meters with a mean height from 100 to 200 meters, and 40 meters with a height from 200 to 300 meters. Probability of deviations falling within these limits is 90 percent.

From this one can conclude that within a range of ceilings up to 200 meters, with a reliable forecast, deviations between mean ceiling height and actual values will not exceed 30 meters, with a 90 percent probability. This amount of forecast error is tolerable for running instrument approaches near or at weather minimums, particularly if one considers that as the ceiling drops, fluctuations in ceiling height around a mean value decrease.

The possibility of forecasting a mean ceiling is dictated by the specific features of the spectrum of ceiling fluctuations. There are two regions which are fairly clearly delineated within this spectrum, situated in the high-frequency and low-frequency areas of the spectrum, between which there is a gap

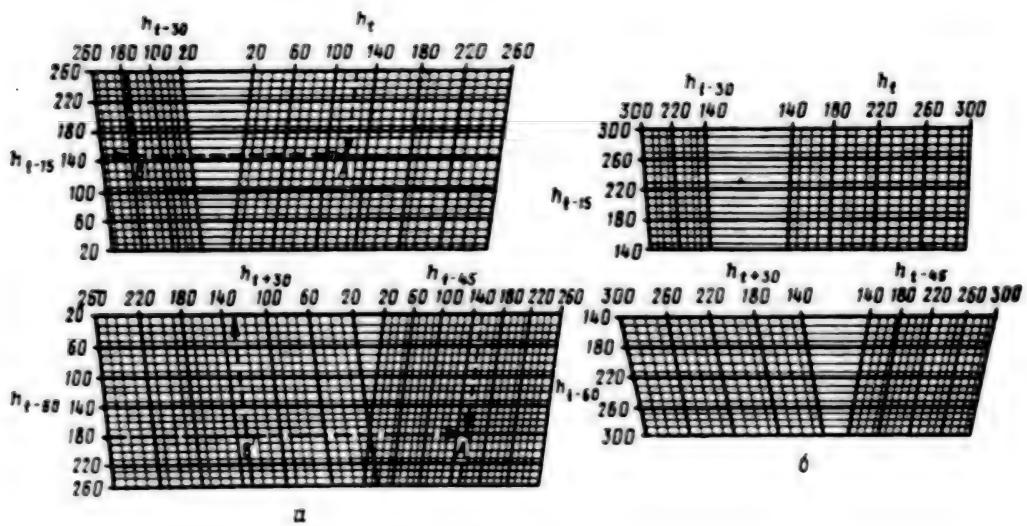


Figure 1. Nomogram for a 30-minute ceiling forecast:

a)  $\bar{h} < 200$  m; b)  $200 \leq \bar{h} < 300$  m.

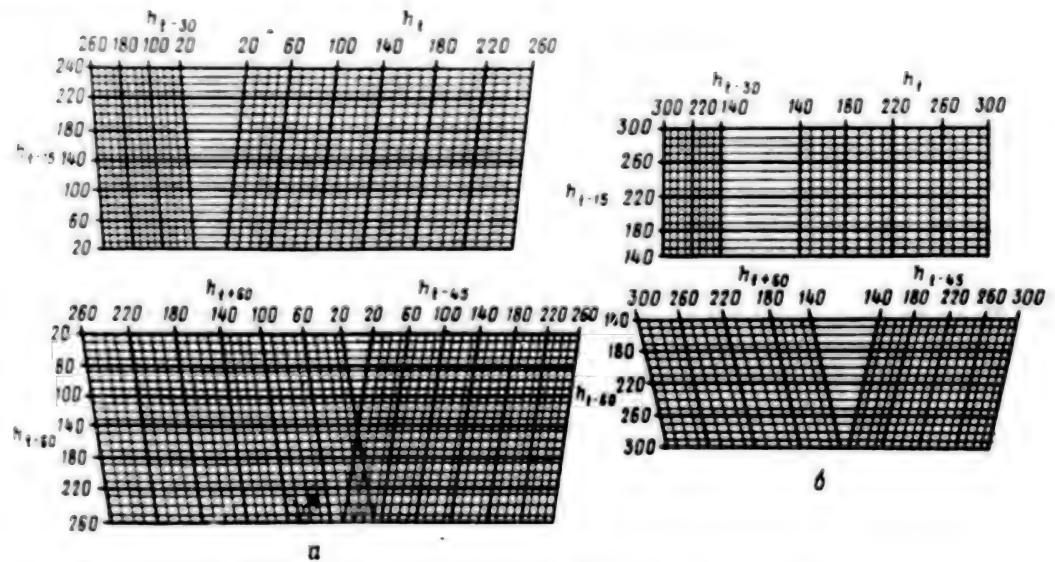


Figure 2. Nomogram for a 60-minute ceiling forecast:

a)  $\bar{h} < 200$  m; b)  $200 \leq \bar{h} < 300$  m.

in the spectral density function. High-frequency fluctuations in ceiling are generated by turbulence and are of a random nature. The period of these fluctuations ranges from several seconds to 5 minutes. Low-frequency fluctuations

occur under the influence of meso- and macro-scale weather processes caused by change in the synoptic situation, by the diurnal flow of weather components, by the influence of the underlying surface, etc. The period of fluctuations ranges from 15 minutes to several hours, with maximum energy contained by fluctuations with a period of approximately 40 minutes.

The spectral density of low-frequency fluctuations is considerably greater than that of high-frequency fluctuations, and therefore it is they which primarily determine ceiling heights. These fluctuations can be represented in a form of a background, onto which are superimposed high-frequency fluctuations of smaller amplitude.

Thus the problem of forecasting boils down to extrapolation of a mean ceiling. It is expedient to employ statistical methods, the merit of which lies in capability of integrated consideration of factors affecting the height of a cloud ceiling, without a quantitative estimate of each factor.

Proceeding from the properties of cloud ceiling time series, the method of autoregression -- a running mean -- should be employed in their prediction. The prognostic formula employed is in the form of a recurrent expression:

$$\tilde{h}_{t+15} = Ah_t - Bh_{t-15} + Ch_{t-30},$$

where A, B and C are dimensionless parameters calculated in relation to the form of cloud cover, cloud bases or ceiling, and time of year;  $\tilde{h}_{t+15}$  -- prognostic ceiling value 15 minutes after initial point in time;  $h_t$ ,  $h_{t-15}$  and  $h_{t-30}$  -- mean ceiling values at initial point in time ( $t$ ) and points in time preceding it by 15 and 30 minutes.

To make a forecast for the following time interval (30 minutes), the calculated prognostic ceiling value ( $\tilde{h}_{t+15}$ ) is substituted into this formula, which assumes the following form:

$$\tilde{h}_{t+30} = Ah_{t+15} - Bh_t + Ch_{t-15}.$$

The same procedure is followed in predicting for 45 and 60 minutes.

Nomograms (figures 1, 2) have been plotted according to the computation formulas for forecasting nimbostratus and stratus cloud cover ceilings for 30 and 60 minutes, during the cold-weather season. If the mean ceiling value for the preceding hour is not above 200 meters, one can use the nomograms contained in Figure 1, and if the mean value ranges from 200 to 300 meters, one can use the nomograms in Figure 2.

The sequence of computations with their aid is indicated by a dashed line, with the example of a 30-minute forecast (Figure 1a). Let us assume that the ceiling for the preceding hour had the following values:  $h_t=120$  m,  $h_{t-15}=150$  m,  $h_{t-30}=170$  m,  $h_{t-45}=150$  m,  $h_{t-60}=180$  m. On the nomogram we find point A according to values  $h_t$  and  $h_{t-15}$ , point B with values  $h_{t-15}$  and  $h_{t-30}$ , and point A' from values  $h_{t-45}$  and  $h_{t-60}$ . We plot a segment equal to AB along a horizontal from point A', and we determine point B'. The prognostic ceiling value obtained on scale  $h_{t+30}$  is equal to 130 m.

The correctness of such a forecast (with an error of less than 30 meters) for ceilings to 100 meters is 92 and 84 percent for a 30 and 60-minute forecast respectively. Forecast accuracy diminishes with rising ceilings. It is 85 and 71 percent respectively with ceilings of 100-200 meters and 30 and 60-minute forecasts, and 71 and 63 percent with ceilings from 200 to 300 meters.

Analysis of the validity of this method of predicting cloud ceilings indicates that it is appropriate to use with a mean ceiling of less than 100 meters with a 30 and 60-minute forecast, as well as with a ceiling of 100-200 meters with up to a 30-minute forecast. Forecasting error will not exceed 30 meters 90 percent of the time.

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## TECHNICAL MAINTENANCE UNIT STRIVES TO IMPROVE PERFORMANCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 38-39

[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by Col A. Demin: "With a Guarantee Not Less Than Factory Warranty"]

[Text] Regimental technical maintenance unit specialists were perched on stepladders, working on a fighter, access covers removed and sprouting tangles of hoses. They were carefully inspecting aircraft systems, checking instrument readings against standard readings, and closely inspecting every part and component.

An aircraft bearing a mark of "Excellent" on its fuselage has logged the prescribed number of hours without a single malfunction, enabling its crew to log the required number of flying hours and bringing them deserved fame. The pilots always share this fame equally with the ground maintenance people. Now it was time to ready the fighter for continued reliable operation.

Engr-Gds Capt A. Popletayev halted at the end of the building, resting his gaze on the aircraft.

"In the past, Vladimir Semenovich, we really had it made," he turned to technical maintenance unit deputy chief for political affairs Gdr Capt V. Yeremeyev, who had walked up. "Things were freer and easier both for men and machines. Several aircraft were accommodated in this little area. And now? What can I say! The equipment is totally different today...."

Yeremeyev looked at the technical maintenance unit deputy chief with respect. Under the guidance of Anatoliy Yegorovich Popletayev the maintenance specialists, many of whom are now recognized as experts at bringing performance to precision standards, have provided maintenance to many aircraft. The people in the technical maintenance unit have learned to grasp his meaning immediately.

Today Popletayev was clearly dissatisfied with the way things were going. It began with the first inspection of electronic equipment assemblies and a discovered malfunction. From time to time they would encounter a hidden malfunction. They would test the unit once, a second time, and the next time the equipment was switched on the tone quality of received signals would suddenly change abruptly.

Anatoliy Yegorovich spent about an hour and a half on the aircraft radio together with officer V. Nerobov, a radio communications equipment specialist. They got nowhere. They consulted with the squadron maintenance group radio people: how should they proceed?

"Don't worry about it," they replied. "No problem. The main thing is that the stages are testing out within normal limits and reception is not cutting out. The equipment can be adjusted."

Anatoliy Yegorovich recalled a conversation between aircraft commanders he had heard by chance in a navigator training classroom (at the time he was assisting innovators). The officers were discussing errors made by radio maintenance specialists in tone circuit adjustment. As a result of this, when radio reception weakened close to the ground, the pilots would practically confuse their numbers. And now almost the same thing had cropped up again. In the meantime additional radio specialists had arrived.

...In the group's shop, where electronics reigned supreme, the radar equipment senior technician checked the unit. The malfunction was also of interest to him.

"Sergey Aleksandrovich," he turned to young officer Safonov, "let's have a technical consultation."

He thought for a moment, and then made a surmise about the puzzling malfunction. They unfolded a schematic. Each of them "went" through the circuits which affect to various degrees the tone quality of the signal. Some time later they finally succeeded in pinpointing and correcting the malfunction. As a result the aircraft radio began operating precisely to specifications.

Constantly backing up the experts, officer O. Borisov, V. Sidorov and other specialists always endeavor to organize performance of maintenance operations on schedule and with a guarantee not less than the factory warranty. The other guardsmen also emulate them. WO A. Krivonosov, Jr Sgt G. Ivanov, and Pvt A. Panfilov, for example, have achieved substantial results in competition to honor in a worthy manner the 66th anniversary of the Soviet Army and Navy, and perform maintenance work with excellent quality and precisely according to schedule. They thoroughly inspect aircraft brought to the technical maintenance unit and meticulously adjust the output parameters of airborne systems assemblies and units. And they do this not by eye but employ scientifically substantiated methods, many of which were born in the course of competition.

Maintenance group chiefs and their subordinates believe that the main thing is rigorous observance of the requirements of Uniform Technical Maintenance Regulations. At the same time they work persistently to achieve excellent quality of each operation performed, for accurate forecasting and prevention of aircraft equipment and armament failures.

Particular attention in the technical maintenance unit is devoted to testing vacuum tubes, transistors, and other components of complex electronic circuits. Vanguard specialists subordinate each and every step to the requirements of shop manuals and regulations as well as good shop procedures.

Precisely observing aircraft systems inspection and adjustment schedules, officers A. Ignatov, M. Kudrin and others meet all the provisions of the Uniform Regulations promptly and with excellent quality. They approach in an innovative manner the solving of complex problems of ensuring a high degree of combat readiness of aircraft systems, heed the advice of experienced specialists, learn to maintain their work stations in an exemplary state, and employ the most efficient techniques of inspection, tuning and predicting the operation of assemblies and units.

The chiefs and mechanics of the radio, radar and other groups, for example, endeavor to determine the signs indicating failure of a component at that moment when it is still operating properly. Particular attention is focused on well-reasoned prediction. The typical malfunction analysis method was used, for example, to establish that the majority of malfunctions develop due to gradual deterioration of the slope of vacuum tube plate current characteristic curves. As we know, equipment operational reliability can be improved by several ways. One of these is prediction by the method of monitoring change in supply voltages, tube plate and cathode voltages, for example. One simulates deterioration of parameters by an amount equal to their natural decrease during the forecast period. Practical experience has shown that the most effective and convenient for prediction is a cathode heater voltage decrease by a specific value, for example. No negative processes take place in the component. But it is easier to distinguish a component in the process of failing from a perfectly good component on the basis of recorded characteristic curves.

Malfunction prevention experience amassed by the technical maintenance unit people is very helpful in improving the failure-free operation and reliability of airborne systems. Therefore personnel are working together, seeking new ways to improve the quality of equipment servicing and maintenance, are increasing their knowledge of theory and honing their skills.

Maintenance procedures, and especially prediction of equipment failures is a difficult and critically important task, which demands first and foremost precise, well thought-out and scientifically substantiated planning, adoption of advanced technology, efficient operation-by-operation testing and cross-checking, and a high degree of specialist personnel discipline and organization, for safety of aircraft mission execution depends in large measure on quality of the labor of technical maintenance units personnel. Gds Engr-Capt A. Popletayev and his men work tirelessly seeking untapped reserve potential for improving the quality and efficiency of their labor. They have devised and incorporated a number of unique solutions which make it possible to speed up performance of maintenance procedures and improve their quality.

Up until recently it would happen that the condition and operating efficiency of certain systems, units and modules would be evaluated not entirely accurately. Once one of the officers reported that following completion of maintenance procedures he had stopped the process of firing up an engine when he heard banging sounds.

"What was the temperature?" the group chief inquired.

"Normal, but it seemed to be rising...."

An inspection showed that the engine was in good working order. But there was one peculiarity -- the exhaust gas temperature was rising abnormally rapidly. The maintenance technician had done the right thing in shutting down the engine: it was necessary to perform an adjustment.

Assimilation and improvement of the basic rules and procedures of predicting malfunctions and performing maintenance procedures faced maintenance specialists with the necessity on the one hand of learning to determine the causes of malfunctions and to reduce the time required to correct problems, and on the other hand to reduce labor expenditures in performing all types of aircraft maintenance procedures in the technical maintenance unit. These tasks have not yet been fully accomplished, but a great deal has been done. All defects were analyzed and the results classified. The obtained data were studied with personnel. As a result the time required to put aircraft equipment back on the line was shortened. For example, previously a mechanic, utilizing the sequential testing method, might spend several hours looking for the reason for the lack of a target blip on the radar sight screen. Thanks to classification of malfunctions, now this takes only a few minutes.

They are shortening prediction time chiefly by means of unique devices, test equipment setups, as well as by devising new techniques. For a long period of time radar equipment maintenance specialists had to move equipment in order to check radars. Innovators devised a unique testing device, and it was no longer necessary to change maintenance station. There was also an improvement in quality of testing and inspection.

Technical maintenance unit personnel devote considerable attention to quality of inspection. Each maintenance specialist endeavors to perform first of all those procedures connected with pressure measurements and checking of gaps and clearances, for measurements are the most labor-intensive operation. If all parameters are nominal, failure-free operation of an assembly is guaranteed to a considerable degree.

In order to eliminate instances of incomplete performance of the list of maintenance procedures, the following rule has been adopted in the subunit: every maintenance technician and mechanic who performs work in the fuselage bays must carefully inspect adjacent systems, units and assemblies and report their condition. Success in this is directly dependent on the skill of the individual. After maintenance groups are made up, they hold equipment servicing and maintenance classes and drills with personnel, not only in their individual area of specialization but in adjacent area as well.

Mutual assistance has been set up well in the technical maintenance unit. Once Gds Sr Lt O. Borisov, for example, decided to help in the professional development of two lieutenants, recent service school graduates. They have now reached their targeted performance level. Thanks to help from their older comrade these young officers now service and maintain aircraft skillfully, knowledgeably, with a high degree of proficiency. They have become proficiency-rated specialists and thoroughly understand the physics of the phenomena which take place in aircraft assemblies and units.

Nevertheless the young men have taken just the first steps in mastering the complex aircraft. The equipment on board a modern fighter is by no means simple. In servicing and maintaining it, technical maintenance unit specialists display a high degree of vigilance. The considerable practical experience gained in performing preventive maintenance and the experience amassed in the technical maintenance unit enable these precision maintenance specialists to prevent malfunctions in the period between inspections and to increase the aircraft's combat capabilities.

In predicting malfunctions, technical maintenance unit personnel rapidly analyze the readings of a great many test instruments and commit to memory dozens of parameters and tolerances. If one must consult a service manual on every single point, one can scarcely complete a job within the allotted time. This means that one must know all principal test values by memory and have a precise understanding of the interlinkage and interdependence of the physical processes taking place in equipment. Such tasks can be accomplished only by technically knowledgeable personnel who have successfully mastered related occupational specialties.

Paramount importance is attached to knowledge of theory in this subunit. Party activists recommended that young officers V. Strel'yayev, S. Safonov and others study together in preparing for proficiency rating tests. They carefully studied the construction and layout of systems and practiced adjusting parameters and mechanical connections. Group chiefs and technicians consulted with them. Explaining the design and specific features of a given unit, they would advise on how to analyze parameters and in what sequence, and how to predict reliability and operational stability of stages and assemblies. This method has produced positive results: the young officers successfully passed this important test.

Usually there is inadequate time available for technical training in the technical maintenance unit. Every day personnel are busy performing maintenance until late into the evening. It is not easy to secure an hour or two for special training classes. Therefore preference is given to independent study. Results are gratifying. Several Air Forces master maintenance personnel have been produced in the subunit; maintenance specialists have a high proficiency rating in their principal job category and have mastered several related job categories. And inasmuch as the maintenance specialists have a high level of technical knowledgeability, the results of their labor are also substantial.

The training year is in full swing. Innovatively mastering all new and advanced developments amassed in the technical maintenance unit, the aircraft maintenance specialists are working persistently to achieve new job performance levels.

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## COSMONAUTS ADD SOLAR PANEL DURING EVA

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) p 43

[Article by V. Vladimirov: "Assembly in Space"]

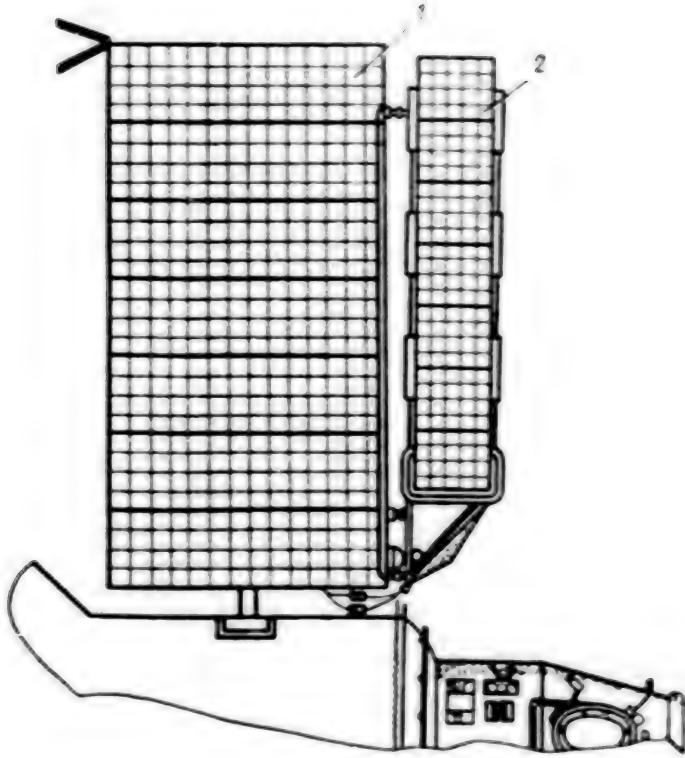
[Text] Today we are accustomed to spacecraft with solar battery "wings." Such configurations have become firmly established both on Earth orbital vehicles and on planetary probes, and this is logical.

Solid-state photoelectric generators, which directly convert solar energy into electricity, are used as the principal sources of self-contained power supply on spacecraft. The sun is a source of such vast energy that one cannot even mentally conceive the vast quantity involved. According to the most conservative estimates, this gratis energy would suffice for 100 billion years. But the average density of solar radiation on the Earth's surface is extremely small. The situation is quite different in space, where there are neither clouds nor dust.

There are two ways to boost the efficiency of solar batteries presently in use: to increase the efficiency of the photocells they employ, and to increase their surface area. While efforts to boost the efficiency of photocells are of a purely terrestrial nature, resident cosmonauts can increase the surface area of orbital "home" solar batteries.

The second method is attractive by virtue of its far-reaching possibilities for practical applications. On the one hand, the limited nature of our planet's fuel resources continues to force us to return to the problem of building powerful orbital electric power stations, which today no longer appears impracticable. On the other hand, increasing the power output of existing stations when necessary, using cosmonauts as a workforce, can be viewed both as an initial experiment in solving the global problem and as a practical contribution toward increasing the efficiency of existing orbital systems.

V. Lyakhov and A. Aleksandrov performed the first in-orbit assembly operation in the history of space exploration. Two additional solar panels were attached to the sides of one of the main solar panels on the Salyut-7 station, which made it possible to boost its power output by more than half.



Structure design of main (1) and added (2) solar panels

The plan of this unique operation was thoroughly discussed by the design office "brain trust," and was subsequently executed on the Salyut-7. What did the scheme entail? The main solar panel was to be installed with a hinged mount with attached winch. They were also to secure containers with the additional panels and to deploy them.

The additional panels were delivered to the station by the Kosmos-1443 orbital spacecraft. The experiment was carried out in two stages and required two similar EVA sessions.

Flight engineer A. Aleksandrov took the first space walk. He secured his feet to special clamping devices (similar to ski bindings and called "Yakor" [Anchor]), was passed a portable TV camera by mission commander V. Lyakhov, and secured it to an exterior mounting bracket, with the camera lens pointing toward the solar panel. The mission commander then passed to him a container with the additional panel as well as mounting tools. He tethered them to the station exterior. Grasping handrails, he proceeded almost 6 meters across the station exterior and halted at the installation site.

Lyakhov came out the hatch, carried over to the installation site and secured the container and tools. He then secured the main panel with the aid of an extensible locking pin, so that it could not turn or swing. At this same time the flight engineer prepared the work station for the experiment: he opened the

"Yakor'" and an exterior handrail. Now he could proceed with the installation.

Aleksandrov opened the mounting bracket with the winch mounted on the main panel. This winch provides capability to hoist an additional panel like a ship's sail. The mission commander and flight engineer took the container and secured it with two locking pins to the end surface of the main panel. The mission commander then joined electrical connectors and, after performing a number of work operations, joined the end of the main panel cable to the pin of the additional panel. The flight engineer removed the container from the additional panel and passed it to the mission commander to secure on the station adaptor module. After turning the additional panel 90° and slowly turning the winch handle, he proceeded to deploy it along the main panel. As soon as the pin entered the main panel latching aperture, an indicator flag appeared. This indicated that the additional solar panel was in place (see figure).

After completing installation, the cosmonauts mounted a protective sunglare shield and positioned the solar panels in working configuration, releasing them from secured position. They then retrieved the empty container and reentered the station.

At first glance the operation seems simple. In actual fact, however, it is of a unique nature and required considerable physical exertion and precision of execution on the part of the cosmonauts.

Of course such operations, especially initially, are impossible without thorough preparation on the ground. Work procedures in space were repeatedly rehearsed in the weightlessness simulation tank. The designers and engineers closely observed each phase, making suggestions and adjustments. The Mission Control Center operators also conducted numerous practice sessions. Subsequently we observed every step taken by the cosmonauts on the monitors at Mission Control Center, ready to come to their assistance instantly.

Successful completion of this EVA installation job demonstrated that man is capable of substantially influencing the design and construction of orbital systems currently in operation, expanding their operational capabilities.

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## HIGHLIGHTS OF SOVIET SPACE PROGRAM REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 84 (signed to press 3 Jan 84) pp 44-45

[Article by Candidate of Technical Sciences Engr-Col V. Gor'kov: "Beyond the Barrier of the Unknown"]

[Text] "I believe I shall play the role of pioneer," wrote K. E. Tsiolkovskiy in one of his works. "Mathematicians, more knowledgeable and stronger, will perhaps complete solving the problems I have formulated. Knowledgeable and experienced technicians will help them build an actual spacecraft." Konstantin Eduardovich's dreams have come true. He indeed became a pioneer of a new undertaking, the founder of astronautics. Our country produced the outstanding mathematicians, experienced technicians and other specialists who implemented his schemes. He did right in passing on "all my writings on aviation, rocketry and interplanetary flight to the Bolshevik Party and the Soviet authorities -- the true leaders of mankind's cultural advance." Under the guidance of the CPSU the Soviet people have built a mighty industry and have constructed a solid material foundation for the conquest of space. Our great countryman almost lived long enough to see his ideas begin to be implemented.

It was December 1950. The question of scientific investigation with the aid of rockets was on the agenda of a joint session of the USSR Academy of Sciences and Academy of Medical Sciences. A debate ensued. A. Pokrovskiy and V. Yazdovskiy argued that the principal physiological functions of dogs -- blood circulation, respiration -- as well as their behavior are fairly close to that of humans, and therefore these animals should be the first space explorers. Other scientists were of the opinion that smaller animals, such as mice and rats, should be sent up first. Academician A. Blagonravov, named chairman of the State Commission for Organization and Conduct of Rocket Flights Carrying Animals on Board, supported the first view. The V-1A geophysical rocket, carrying the dogs Tsygan and Dezik as passengers, was launched on 22 June 1951.

At a meeting in the spring of 1956 Sergey Pavlovich Korolev surprised everybody with a proposal calling for a manned geophysical rocket flight. For a period of 3 months this idea excited the minds of the experts: how should they design the cabin, spacesuit, and life support system? Nor were the physicians remaining idle. A. Genin, A. Skryapin, and Ye. Yuganov submitted a rocket flight proposal. Inasmuch as the main purpose of the flight was to study the

effect on the human organism of the factors involved in rocket-propelled flight, they considered it self-evident that a member of their profession should fly the mission. But such a flight was not destined to take place. After having analyzed all the pros and cons, Korolev decided not to go ahead.

A year after launching of the first artificial Earth satellite, questions connected with manned space flight took on a new prospective. It was necessary first and foremost to solve a twofold problem: to build the spacecraft about which Tsiolkovskiy had dreamed, and to train and prepare a person for a manned mission.

The most difficult problem in developing a spacecraft was that of designing and building a retrorocket motor. Although there was a certain engineering lead on the other systems involved, no methods whatsoever had been developed for safely returning a spacecraft to earth. Even the very approach to igniting a rocket motor in a state of weightlessness, when there is no clear-cut demarcation between liquid and gas in the fuel tanks, presented a problem at that time, for the fuel lines should not contain even the tiniest gas bubbles. A manned spacecraft retrorocket system had been developed by May 1960 at the A. Isayev Experimental Design Office, and 3 months later the first living creatures -- the dogs Belka and Strelka -- safely returned to Earth from space. They were the first to surmount the most difficult obstacle -- launch into orbit, flight in zero-g, and return to Earth.

But would a human be able to withstand such an ordeal? K. E. Tsiolkovskiy had noted in his writings that spatial disorientation, dizziness connected with change in the functions of the vestibular mechanism, impaired coordination of movements, as well as rushing of blood to the head are possible in a state of weightlessness. This scientist had no doubt that man would be able to adapt to life in "an environment without gravity." He also pointed out that with an extended stay in a condition of weightlessness, changes can occur in the behavior, structure, and function of a living organism, changes which satisfy, to quote him, the "ideal of the new environment." All these theoretical points, however, required verification. And although dogs and other living creatures had experienced weightlessness without consequences, it was not known how man would take such a state.

Scientists proposed all kinds of methods of creating weightlessness in terrestrial conditions with the aid of test beds. This equipment, however, was able to create weightlessness only for a period of several seconds. Utilization of aircraft for this purpose appeared to be more realistic, and therefore more attractive. A state of weightlessness could be extended by flying an aircraft on a specially calculated trajectory path. Initially they employed a two-seater fighter aircraft executing a steep climb. The test subject would be strapped into the second, specially-equipped cockpit. His behavior would be filmed. Certain physiological parameters would also be recorded. The first group of cosmonauts trained on such aircraft. They were all pilots, but on these flights they experienced a zero-g state of such duration for the first time. During these flights they attempted to perform simple tests, drink water, and ingest food.

But what would happen if the subject were released from the confining straps? Would there not be changes in his sensory, motor and autonomic reactions, which serve as indicators of human vitality? In addition, a person cannot be constantly strapped in on lengthy flights in space. It was decided to perform the new test on board a Tu-104 aircraft. One of the passenger cabins of the first jet passenger liner was lined with soft material, and confining nets were placed at the ends. A "swimming pool" was obtained. The aircraft's crew was instructed to produce a zero-g condition of maximum duration.

That which was accomplished comparatively easily on a fighter proved to be difficult on a heavy aircraft. The crew of this aircraft flew dozens of flights before they found the optimal 8,000 meter altitude and perfected a method of creating the required duration of weightlessness. After this the first test personnel and future cosmonauts went up.

In the initial phase of space flight one out of every two or three cosmonauts experienced vestibular mechanism impairment and spatial disorientation. But problems with the vestibular mechanism gradually disappeared. It was ascertained that this was merely a part of the organism's reactions to the unaccustomed conditions of a world without gravity. An aggregate of preventive means was gradually devised. For example, a constant static load on the muscles and skeleton is produced with the aid of G-suit rubber stays, while a dynamic load is produced with a treadmill. The cosmonaut, wearing a gravity suit, is secured to the treadmill by means of a positive load system. This produces the equivalent of a body-weight load on the skeletomuscular system. The cosmonaut can walk, run, and jump, expending considerable physical effort and maintaining coordination of important motor skills. An exercise bicycle is used to prevent deterioration of fitness of the cardiovascular system, and unusual distribution of blood in the organism is prevented with the aid of a "Chibis" [Lapwing] unit. Intravascular hydrostatic blood pressure, which helps ensure movement of blood to the legs, is created in the lower half of the body by reproducing reduced pressure on that part of the body. The arsenal of preventive means also includes other devices as well as pharmacological preparations.

But let us return to the end of the 1950's. An inner and an outer radiation belt -- a cluster of charged particles confined by the Earth's magnetic field -- were discovered by the first artificial Earth satellites in 1958. Protons, electrons, and alpha particles move around the Earth from the Northern to the Southern Hemisphere and back, traveling on a spiral path, with a simultaneous longitudinal drift, which is much slower, it is true. The inner belt more closely approaches the planet's surface. In the area of the Brazil magnetic anomaly, where the magnetic field is greatly attenuated, its lower boundary descends to an altitude of 200-300 kilometers. It is higher elsewhere. Measurements have shown that a protracted stay by man in a radiation belt presents a threat of dangerous consequences. Therefore orbital altitude began to be selected taking this phenomenon into account.

The situation was even more complicated regarding protection against solar radiation. Cosmonauts could be protected against powerful chromosphere flares only by a lead shield 1 meter in thickness. It was clearly out of the question to provide such shielding on a spacecraft. There was only one solution -- to

fly manned missions in the intervals between solar flares. In addition, as calculations indicated, they had a low probability of occurrence.

There also appeared to be a significant danger of micrometeorite strikes. Therefore a special spacesuit was designed for cases of possible spacecraft depressurization. A high-altitude pressure suit was actually nothing new. People had used such suits on aircraft, stratosphere balloon ascensions, and had even parachuted in them. Even prior to the Great Patriotic War a number of pressure suits, the best of which were considered to be the TsAGI-8 and Ch-7, were designed and built under the direction of aviation design engineers A. Bayko and Ye. Chertovskiy, pioneers in Soviet pressure suit engineering. These were the predecessors of spacesuits. It was important not only to ensure not only a cosmonaut's survival but also to maintain his work fitness. The suit was designed to keep a cosmonaut afloat in case of a water landing, and to protect him against cold.

Yuriy Gagarin wore a ventilation-type suit consisting of three shells, each of which was in the form of coveralls. The outer shell handled the loads which occurred with overpressure in the suit. Under it was an airtight shell and an insulating suit with a ventilation system. An orange outer suit with a flotation collar would be donned over the pressure suit ensemble. The pressurized helmet contained a double-paned visor.

The matter of the position and configuration of the cosmonaut's body in a spacecraft during launch and descent was thoroughly studied, for a flight would involve quite substantial g-loads. Certain experience in this regard had been acquired in aviation. It indicated that substantial g-loads could exert a harmful effect on the human organism. What should be done? In one of his very first writings, "How to Protect Brittle and Fragile Articles From Shocks and Impacts," written in 1891, K. E. Tsiolkovskiy proposed a solution to this problem. More than half a century has passed since that time. It has been ascertained that the optimal angle of body position to a g-load vector is 80°. This enables a person to withstand a 26.5-fold increase in his own body weight. It was decided to conduct special training on a centrifuge in order to enable a cosmonaut more easily to endure the conditions of a future space flight.

In addition to protracted g-loads, a cosmonaut also faces the hazard of transient, so-called impact load factors during flight. What will be their magnitude, their force, for example, at the moment of cosmonaut ejection from the spacecraft during descent in the atmosphere? These problems were investigated using MiG-15 and MiG-17 aircraft. Ejection seats were installed in these aircraft, placing the pilot's body in the most advantageous position configuration and automatically immobilizing his arms and legs. This project was culminated with ejection in a pressure suit. This was an aviation first. Ejection was practiced on a specially equipped Il-28 aircraft. Ejection and explosive-charge devices built into the seat enabled the test subject to eject at an altitude of 7,000 meters. A drogue chute would deploy at an altitude of 4,000 meters, followed immediately by the main chute. The test subject, releasing his ejection seat, would descend the rest of the way and touch down.

Specialists readied equipment for the first space flight step by step. Problems connected with cosmonaut selection and training were being resolved at the same

time. Initially approximately 60 percent of the training program time was allocated to medical and biological matters. Cosmonauts were being trained to test not only new equipment but a new environment as well. They had to study the factors involved in a future space flight and determine whether man could live and work in space.

It was anticipated that space would place considerable demands on man's physical capabilities. It is a well-known fact that pilots who regularly engage in sports and physical exercise more easily endure oxygen starvation, accelerations, g-loads, and vibrations. Therefore a cosmonaut physical training plan was devised. It consisted of general physical and specialized sections. The former, which included conventional forms of physical training and athletics, developed stamina, strength, agility, and reaction speed. The latter prepared the organism to encounter unaccustomed conditions. Special training equipment was employed for this: the squirrel cage, the trampoline, the strapdown wheel, etc.

Physicians were endeavoring to develop in the pioneers of space exploration a double or even triple "safety factor." Was this difficult? It was, but there was no other way. Who could say what these demands were?

The higher the barrier of the unknown was, the harder scientists and designers, doctors and cosmonauts, and other specialists worked. In their unified effort, supported by the CPSU and Soviet Government, obstacles were surmounted one after the other. Finally in the eastern part of our country dawn was breaking on that memorable day in April 1961, which signaled the beginning of manned space flight.

More than 20 years have passed since then. Space exploration has developed rapidly during all this time. Those problems which were of concern to the experts on the eve of Yu. Gagarin's flight have today become routine matters. During these years more than 100 persons have flown in space. Cosmonauts from the brother socialist countries and a representative of France have been launched into space on board Soviet spacecraft and have worked in earth orbit. Unmanned probes and interplanetary stations have investigated the Moon, Venus, and Mars. Artificial earth satellites are advancing science and the economy. An orbital scientific research complex is in operation, which is almost continuously manned.

The countenance of the space flight support services has also changed. Simulator complexes have replaced individual test beds and simulators at the Cosmonaut Training Center imeni Yu. A. Gagarin. The command and telemetry station and Mission Control Center network has expanded. The scale of the tasks being performed has increased to such an extent that dozens and sometimes even hundreds of different organizations are involved in mission programs. But no matter how sophisticated space hardware becomes, equipment research and investigation never ends. Recent events connected with the EVA by V. Lyakhov and A. Aleksandrov to expand solar panel capacity are proof of this.

It is no easy matter to amaze people today. But on that memorable day everything took place almost as in a fairy tale. At the Mission Control Center there were two TV monitors facing the mission controller. The monitors showed the cosmonauts installing the additional solar panel. They moved about the station

skin in synchrony, like ballet dancers. And it might have seemed to the un-initiated observer that there was nothing surprising about this. But the fact is that the picture on one of the monitors was coming from space, from the Salyut-7, while the picture on the other monitor... was coming from under water. Yes, under water in the weightlessness simulation tank at the Cosmonaut Training Center imeni Yu. A. Gagarin, two cosmonauts were installing an additional solar panel with the same technique as the cosmonauts in orbit. The body positions and gestures on the TV monitors appeared to be synchronized. And as if confirming this fact, a comment by mission controller V. Ryumin came over the speakers: "Fellows, you are precisely on timetable."

...And these events went down in history. One cannot help but thrill at the courage, self-control, and high degree of professional knowledge on the part of Vladimir Lyakhov and Aleksandr Aleksandrov. As in the past, but perhaps even to a somewhat greater degree, we were... "ousl" following their every movement and gesture. And this was understandable! We were witnessing one of the great pages in the history of Soviet space exploration.

But continuously encountering specific barriers of the unknown and surmounting them, man is broadening his horizons, his knowledge, and is gaining confidence in the correctness of the chosen path.

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## SEABED EXPLORATION LIKENED TO SPACE EXPLORATION

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[Interview with Soviet cosmonaut Lt Gen Avn German Stepanovich Titov, Candidate of Technical Sciences Ivan Fedorovich Glumov, general manager of the Yuzhmornegologiya Production Association, and Capt 1st Rank Oleg Mikhaylovich Lisov, expert on maritime law, by AVIATSIYA I KOSMONAVTIKA special correspondent: "I See the Ocean Floor...."]

[Text] Actively participate in solving international problems in the area of raw materials, fuel and energy, food supply, environmental protection, peaceful exploration of space, exploitation of the resources of the World Ocean, and in improving international economic relations on a foundation of fairness and equality.

From the "Basic Directions of Economic and Social Development of the USSR for 1981-1985 and the Period Up to 1990"

Aircraft and space vehicles have enabled geologists to look at the Earth from above, viewing practically entire continents. This journal has written in the past about their help in mineral exploration. In this article we shall discuss one of the most acute problems of the present day -- utilization of the raw material resources of the World Ocean. Approximately 60-80 million square kilometers of the seabed are today considered favorable for oil and gas exploration. We are dealing with 65-70 percent of world petroleum reserves. Approximately 700 offshore oil and gas fields have been discovered to date, which are contributing up to 20 percent of total oil production in the capitalist countries.

Soviet oilmen on the Caspian were among the first to engage in offshore oil production. Today oil rigs can be seen on the Black Sea and the Baltic, in the North Sea off the coast of Norway and Britain, in the Persian Gulf and the seas of Southeast Asia, off the coast of Alaska, California, and Australia. In the coming decade oil and gas

drilling will be conducted at sea depths not only of dozens and hundreds of meters but also at the first kilometer sea depths.

Interest in mining ore and solid minerals, so-called iron-manganese nodules, first developed approximately in the mid-1960's and has steadily increased since that time. Iron-manganese nodules are rounded lumps, about the size of a small potato, gray-brown in color. They comprise depositions of oxides of iron and manganese. And that is not all. Diamonds, gold, cobalt, pearls, and even... fresh water lie concealed under the sea. But the paradox is that with the present level of development of technology it is considerably easier to reach the surface of the Moon than the ocean floor, which is only a few kilometers from the deck of an ocean liner.

Nevertheless the space program plays a role in seabed geological investigations. In particular, a uniform telemetry system provides data transmission from research vessels at sea to a data processing center. This is a beginning, first steps toward implementing the decisions of the 26th CPSU Congress pertaining to practical utilization of space hardware for mineral exploration on the seabed. It is of interest to determine what problems face marine geologists today and to what extent the space program can be applied to resolve these problems.

The following is an interview conducted by a special correspondent of this journal with USSR pilot-cosmonaut Hero of the Soviet Union Lt Gen Avn German Stepanovich Titov, Candidate of Technical Sciences Ivan Fedorovich Glumov, general manager of the Yuzhmorneglogiya Production Association, and Captain 1st Rank Oleg Mikhaylovich Lisov, expert in the field of maritime law.

[Question] Ivan Fedorovich, you have been working the field of marine geology for many years, and I am sure you can explain to our readers how this area of scientific investigation, which at one time was little known, has today gained world renown. How did this happen?

[Glumov] Advances in science and technology and growing requirements in raw materials connected with these advances explain heightened interest on the part of various countries of the world in exploration for and exploitation of seabed mineral resources. This is dictated primarily by the limited nature of the natural resources of the landmasses. They are becoming depleted, and mineral production is becoming increasingly more difficult and costly. The probability of discovering new mineral deposits on the landmasses is diminishing. At the same time it has been proven, as a result of systematic geologic exploration of the ocean, that the seabed contains vast reserves of minerals. Some deposits discovered in coastal waters of the World Ocean are already being exploited, while others (deep-water) are being surveyed and will commence exploitation development in the near future.

[Question] As practical experience has shown, exploration and exploitation of space and the ocean depths contain a number of common features and even a considerable similarity. In both cases the specific peculiarities of the environment impose restrictions on man's activity, prompt development of the most advanced technology of the 20th century, and promote utilization of special equipment of two types: unmanned, and manned. Would you tell us how marine mineral prospecting is conducted?

[Glumov] First I should like to say that the idea of mining minerals in the seas and oceans is not new. Salt has been obtained from the sea from ancient times, and more recently bromine and magnesium have been extracted. Minerals from such placer-type deposits as passiterite have been mined from coastal sediments in various parts of the world. For the most part, however, the secrets of the World Ocean did not begin to be revealed prior to the present century. More precisely, greater knowledge began to be obtained on the World Ocean and the seabed together with the beginning of practical investigation of space. In both instances man encountered first and foremost a little-studied environment and a great many factors affecting man's life. Some of these are strange to us, others are unpleasant, while still others, such as caisson disease, can lead to the most tragic consequences. The time required for diver decompression following an extended stay at a depth of 250 meters is equal to the time required for an astronaut to return from the moon. But the bends are not the only hazard lurking in wait for man under water. Under pressure nitrogen becomes a narcotic, while oxygen poisons the organism. In order for man to be able to live and work under water without detriment to his health, it is necessary to devise compression and decompression regimes (analogous to the situation in space: adaptation and readaptation), to choose breathing mixtures, and to design life-support systems which protect man against the hostile effects of the undersea environment. Thus there are as many problems involved in undersea medicine as in space medicine. This is why in marine geology, just as in space exploration, unmanned probes are first sent into the unknown depths of the sea. As we know, visibility is restricted under water. Light scatters, and the outline and configuration of objects become indistinct. Visible light rays disappear entirely at a depth of 100-150 meters, and total darkness reigns on the ocean floor. Therefore optical means are suitable only for close-range observation. It has been ascertained, however, that sound propagates freely in a water mass, or more accurately, ultrasound, which reaches the seabed unimpeded even in the deepest oceanic trenches. Just as any sound, it produces an echo upon reflecting back from obstacles. Thus if one knows the velocity of propagation of ultrasound in water, one can calculate the depth of the ocean. This made it possible to develop the echo sounder. Just 40 years ago, on the first Soviet drifting station, the SP-1, Papanin, Shirshov, Fedorov, and Krenkel measured the sea depth with a heavy sounding lead on the end of a length of hand-winch piano wire. A single measurement took an entire working day, and accuracy of course was poor. Today one can, employing an echo sounder, record the seabed profile on a real-time basis in the process of a vessel's movement. Geophysical investigation methods, particularly seismic surveying, play a leading role in study of the geologic structure of the oceans. The wave nature of elastic seismic vibrations enables us to study their propagation on the basis of the same laws as the laws of propagation of light. Rock masses contain reflecting and refracting surfaces. By studying the velocities and paths of

seismic waves to these surfaces, one can solve a number of major problems pertaining to the geologic structure of the Earth's crust without employing drilling. Other marine geophysical methods also furnish us with important information on the specific features of the structure of the Earth's interior under thick bodies of ocean. Thanks to advances in marine geology and geophysics in the last several decades, we now possess fairly good knowledge of the principal seabed topographic forms. Continents are usually ringed by a shelf of varying width, which comprises a part of the landmass, covered by water. Beds of construction materials, placer-type deposits, and phosphorites are most frequently encountered on the continental shelf. The same mineral deposits can be discovered under the continental shelf as on dry land. The most important of these are oil and gas. In the direction toward the sea the continental shelf grades into the continental slope, the foot of which is the undersea margin of the continental landmass. The boundary between the continental and oceanic crust runs somewhere in the vicinity of the base of the continental slope. Our association does not merely utilize modern technological advances but also designs and builds the latest geophysical equipment, which has been designed specifically for the purpose of accomplishing those important tasks which face us.

[Question] German Stepanovich, what potential does space hardware possess for terrestrial investigations, and what remote sensing methods in your opinion have promise for exploration of the World Ocean, and in particular for marine geology?

[Titov] Study of Earth resources by remote sensing methods has in recent years become one of the principal areas of space program activity. The arsenal of technical means enabling us to observe our planet from space is fairly large. Means include still cameras, motion-picture cameras, infrared sensing equipment, microwave and laser radar. Photographic equipment comprises the major hardware, however, since it is precisely photography which enables us to obtain the greatest volume of information in virtually any Earth science: from atmospheric physics to geology. Multispectral coverage is now employed, utilizing electro-optical scanning systems. They also help in ocean research. Imagery at various wavelengths (from blue to red) enables us to take ocean cuts at different depth, as it were, and to analyze the entire aggregate of seabed topography. Ridge crests which emerge above the water surface, for example, analyze well in the near infrared and red regions, while depressions between ridges analyze well in the blue region. Seabed sediments appear in various-color synthesized images. Thus satellite photography enables us to evaluate seabed vegetation, type of seabed sediments, their principal material and admixtures. This of course applies only to shallow-water areas of seas and oceans. In the process of mining minerals, part of the seabed material will enter suspension. I do not believe it is necessary to argue the benefit of employing satellite photography for analysis of man's activities in this area. Even the reader who is uninformed in these matters is convinced of its need. We have experience in studying the movement of suspended matter transported by rivers into bodies of water. This experience was first obtained with the aid of an MKF-6 unit carried on board the Soyuz-22 spacecraft. On that mission Valeriy Bykovskiy and Vladimir Aksenov took photographs of Baykal, which appeared in many newspapers and magazines throughout the world. The methodology of studying the propagation of suspended matter and pollution of bodies of water consists in determining the boundaries

of spread of turbid waters. Imagery covering multiple bandwidths is indispensable. As Ivan Fedorovich has stated, methods of investigation based on ultrasound are extensively employed in studying the ocean. In this connection I should like to voice an idea borrowed from the Soviet-U.S.-Canadian-French Cospas-Sarsat vessel and aircraft search and rescue project. Last year this journal published an article which discussed this system and reported that its first satellite, Kosmos-1383, helped save seven lives in a period of one month. The substance of the proposed idea is essentially the same: to use sonobuoys and communication and navigation system satellites. I should like to present the following idea. Its substance is quite simple: using sonobuoys and communication and navigation satellites for studying the seabed. Buoys carrying passive or active radio gear would drift in ocean currents. From time to time navigation satellites would determine their position coordinates, while communication satellites would receive data from them and transmit it to mission control center or to a data processing facility: "I see the ocean floor...." This is how I envisage future preliminary prospecting for minerals on the seabed.

[Question] One year ago the Soviet Government made a statement about U.S. obstructive policy pertaining to exploitation of seabed resources. Could you tell us, Oleg Mikhaylovich, the history of the legal aspect of this issue and what legal provisions presently exist?

[Lisov] In 1968 the UN General Assembly passed a resolution calling for establishment of a special committee on peaceful utilization of the seabed and ocean floor. An urgent need to resolve other questions of maritime law as well led to the changing of this body into a permanent committee to make preparations for the Third UN Conference on Law of the Sea. The committee was formed in December 1973, and since then it has held 11 meetings in New York and Geneva with the participation of more than 150 nations. The purpose of the conference was to draft and adopt a comprehensive Convention on Law of the Sea -- an international basis of standards of conduct on the sea and regulation of problems pertaining to utilization of various regions of the World Ocean, the seabed and ocean resources. The last Convention on Law of the Sea was approved in 1982 by 130 votes. The United States, Israel, Turkey, and Venezuela voted against it. Seventeen countries, including the USSR, abstained. The Convention was signed by the Soviet Union in December 1982. This Convention is intended to regulate international cooperation in the area of development and utilization of the World Ocean, its resources, the seabed and seabed resources. It defines the boundaries of maritime zones, continental shelf regimen and boundary, stipulates rules of marine and air navigation, and regulates matters pertaining to fishing on the high seas and in territorial waters. In conformity with existing standards, one year after at least 60 countries have ratified this document, it will come into force. And precisely at this time the United States issues a declaration of its policy in matters pertaining to utilization of the World Ocean and its resources. The United States continues its intention not to sign the new UN convention on law of the sea and is proclaiming its intention to act as it sees fit regarding the riches of the World Ocean. In this situation the government of the USSR has also issued a statement: "The actions of the present U.S. Administration are nothing more than an attempt to sow seeds of chaos in matters pertaining to utilization of the World Ocean and to undermine

the foundations of mutually beneficial cooperation among nations in this vitally important domain of human activity, which cannot help but evoke serious concern on the part of the majority of countries. The Soviet Union shares this concern and, together with other countries, emphatically rejects the policy of riding roughshod over other nations which the United States seeks to pursue in this domain as well."

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